

3/635-22

Copy 3
(In complete)

1 Impl.

Report. Cholera. 1848. 1849.

Duplicate

A. Rutton

3/635-22

Bibliotheca Pereira
1853

MAP

Exhibiting the progress of
THE LATE EPIDEMIC CHOLERA
FROM HINDOSTAN TO
GREAT BRITAIN.

PLACES AND DATES OF ATTACK.

Hindustan in various districts, annually from 1817 to 1845.
1845.

1 Cabool, Hot season. 2 Umballa, July. 3 Ceylon, Nov.
1846.

4 Bombay, Spring.	10 Sheerex,	} Autumn.
5 Kurrachee, June.	11 Diarbekar,	
6 Teheran, July.	12 Derbend,	
7 Tabreez, Autumn.	13 Mossul, October.	
8 Ispahan, } Sept.	14 Damascus, } November.	
9 Bagdad,	15 Aleppo,	

1847.

16 Mecca, January.	18 Astracan, June.
17 Trebixonde, Spring.	19 Moscow, September 18 th .

1848.

20 St. Petersburg,	23 Tintah, July.
21 Berlin,	24 Hamburg, September.
22 Constantinople,	25 Edinburgh, October 1 st .



REPORT

OF THE

Thos Pollak

GENERAL BOARD OF HEALTH

ON THE

EPIDEMIC CHOLERA

OF

1848 & 1849.

Presented to both Houses of Parliament by Command of Her Majesty.



LONDON:

PRINTED BY W. CLOWES & SONS, STAMFORD STREET,
FOR HER MAJESTY'S STATIONERY OFFICE.

1850.

LIST OF MAPS, DIAGRAMS, AND TABLES.

- Map of the Progress of Cholera from Hindostan to Great Britain, to face Title-page of Report.
- Diagram of comparison of Mortality, from all causes and from Cholera, in the Metropolis, to face page 26 of Report.
- Plan of Glasgow, to face Title-page of Appendix A.
- Plate 1, to face page 46 of Report.
- Plate 6, to face page 55 of Appendix A.
- Plate 7, to face page 56 of Appendix A.
- Plate 8, to face page 103 of Report.
- Plates 9 and 10, to face page 80 of Appendix A.
- Plates 11, 12, and 13, to face page 104 of Report.
- Plate 14, to face page 119 of Appendix A.
- Plan of Hamburg, to face Title of Appendix B.
- | | | |
|--|---|--|
| <p>Cholera Map of the Metropolis</p> <p>Sections of ditto</p> <p>Plan of the parish of St. Leonard, Shoreditch</p> <p>Map of the parish of Bethnal-green</p> | } | To be placed at the end of Appendix B. |
|--|---|--|
- Table A. Cost of Widowhood and Orphanage in 12 Unions, p. 151.
- Table B. Progress of Epidemic Cholera in Great Britain, p. 152.
- Table 1. Return of Deaths from Cholera in 60 weeks in the Metropolis, to be placed at the end of Appendix B.
- Tables 2 and 3. Analysis of Deaths from Cholera, to be placed at the end of the Report.

CONTENTS.

	PAGE
Report on Epidemic Cholera	1
Extensive experience of the Epidemic	2
Progress of the Epidemic in India	3
Extension of the Epidemic to Persia	4
Progress through Asiatic Turkey and Georgia	5
Arrival at Moscow	6
Outbreak in Egypt	7
Arrival in Great Britain	8
Warnings given of its approach, preceded by general prevalence of Diarrhœa	} 9, 10
Comparative severity of the Epidemic	11
Progress of the Epidemic in the Metropolis, and unwillingness to acknow- ledge the presence of the Disease	} 12, 13
History of early Cases in the Metropolis	14
„ „ in other Towns	15-17
Return to the same Countries, Towns, and Houses	18
Warning addressed to Local Authorities	19
Haunts of Fever and Cholera the same—instances from Superintending Inspector's Reports	} 20-22
Epidemic attacked in Groups	23
Prevalence near the Banks of the Thames	24
Comparative Mortality in North and South Districts	25
Atmospheric Changes in London	26
„ „ at Kurrachee	27
Influence of Heat and Moisture.—Influence of the Atmosphere	28, 29
Attacks not confined to the weak and sickly. Disease not confined to the Poor	} 30-31
Mode of Propagation	32, 34
Nurses and Washerwomen attacked	35
Localizing Causes.—Overcrowding	36-39
Filth.—Artificial Manure	40-42
Offensive Sewers and Piggeries	43
Poisonous Effluvia wafted to a distance	44
Town Refuse	45
Experience of Prison at Brest	46
Malaria from Putrescent Mud, Foul Canals and Ditches	47-49
Dampness.—Dampness of Houses on hill sides	50, 51
Injurious effects of polluted Drainage	52

	PAGE
Predisposing effects of Dampness	53
Higher flats of Houses the most unhealthy	54
Want of Drains.—Drains unskillfully constructed	55, 56
Emanations from Foul Sewers	57
Graveyards	58
Unwholesome Water, Metropolitan experience, Manchester, Marsh Water	59-62
Food.—Effects of improper Articles of Food	63, 64
Effects of Intemperance	65
Fatigue	66
Exemptions from attack, Metropolitan Buildings and others	67-69
Ships, Prisons, Lunatic Asylums	70-72
Benefit from minor Improvements.—From removal of Nuisances	73-75
Excessive Mortality followed by excess of Births	76
Results of Inquiry at Bristol and other places	77, 78
Responsibility of Local Authorities	79
Neglect of Preventive Measures in the Metropolis	80, 81
" " in Provincial Towns	82, 83
External and Internal Cleansing	84, 85
Lime-washing	86, 87
House-to-House Visitation	88
Premonitory Diarrhœa in Towns in England and Scotland	89
Unity of the Disease in all its Stages	90
Proofs that Diarrhœa is premonitory of Cholera	91, 92
Transition of Diarrhœa into Fever	93
Comparative Mortality of different Stages of Diarrhœa	94
Neglect of Premonitory Diarrhœa by the Poor in the Metropolis	95-97
Apathy produced by Epidemic Influence	98-100
Results of House-to-House Visitation	101, 102
" in Dumfries and other Scotch Towns	103, 104
" in Manchester	105
Preventive Measures in Hull	106
" Sheffield	107, 108
" the Metropolis	109, 110
Measures adopted in Bethnal Green	111-113
Results of Visitation System in Shoreditch, and Western Districts	114, 115
General Results of Visitation	116-119
Extent of Relief	120
Gratitude of the Poor in the Metropolis and other Towns	121
Testimony of Superintending Inspectors	122, 123
Houses of Refuge	124
Results of removal to Houses of Refuge	125-127
" " to Tents	128
Cholera Hospitals	129-131
Early removal of the Dead	132-134
Necessity of Houses of Reception	135
Expense of Epidemics	136
Objects of Diseases Prevention Act	137
Obstacles to Administration of Act	138
Administration of Act by Guardians of the Poor	139-141
Zeal and Devotion of Medical Officers	142
General Conclusions	143-149

APPENDIX A.

	PAGE
Report on the Epidemic Cholera of 1848-49	1
Districts under Inspection	2
Localizing Causes of Cholera	3
Signs of an Epidemic Constitution	4
Epidemics haunt the same localities	5
Marks of developed Cholera	6
Localizing Causes of Cholera	7
Illustrations of localizing Causes of Cholera—Errors of Diet	8, 9
Fatal results of overcrowding and defective Ventilation	10, 11
Cholera in Taunton Union Workhouse	12, 13
Predisposing effects of bad Water Supply	14, 15
Fatal effects of Emanations from Town Refuse	16, 17
Predisposing effects of Dampness	18-20
Sanitary evils from defective Structure of large Tenements	21
Greater liability of top flats to Cholera	22
Outbreak of Cholera in Redcross-street, Bristol	23, 24
Fatal results of defective Sanitary improvements	25, 26
Effects of overcrowded Grave-yards	27-29
Effects of Malaria in producing attacks of Cholera	30, 31
Fatal effects of intemperate habits during Epidemics	32
Fatal effects of fatigue	33
Abstract of localizing causes of Cholera	34-40
Localizing causes removable	41, 42
Places of Refuge	43, 44
Premonitory Stage of Cholera	45, 46
Identity of Cholera in its progressive Stages	47, 48
Necessity of checking the earlier Stages	49
Apathy produced by the poison of Cholera	50
Necessity of House-to-House Visitation	51
Medical House-to-House Visitation	52
Organization of House-to-House Visitation	53
Medical Visitation first adopted in Dumfries	54
Striking results of Medical Visitation	55, 56
Reports on Cholera in Dumfries	57-69
Report on Cholera in Glasgow	70-86
,, Manchester	87-100
,, Hull	101-106
,, Sheffield	107-110
Abstract of Reports on Cholera in Liverpool	111-113
,, ,, Wolverhampton	114
,, ,, Dundee	115-117
,, ,, Hamilton	118
,, ,, Glengarnock Iron-works. Coatbridge	119
,, ,, Carnbroe	120
,, ,, Leeds	121
,, ,, Sunderland	122
,, ,, Edinburgh	123, 124
,, ,, Bristol	125, 126
Advantages of Home Treatment of Cholera	127
Statistics of Home and Hospital Treatment	128
Necessity of Home Treatment of Cholera	129

	PAGE
Early Interment of the Dead	130, 131
Necessity of intermediate Reception Houses	132, 133
Execution of Regulations	134
Defective administration of preparatory Measures	135
Regulations for medical Relief	136
Defects in Legislative Provisions	137, 138
Loss of life from the nature of the Authority	139
Cholera on board the " American Eagle "	140-145
Conclusions	146-149

APPENDIX :—

Table I. Daily Table of Premonitory Cases and Cholera in Glasgow	151-153
Table II. Aggregate returns for each district in Glasgow	154
Table III. Daily ratios of Premonitory Cases to Cholera in Glasgow	155
Table IV. Statistics of Cholera in Parkhead	156
Table V. Statistics of Cholera in Hull	157
Table VI. Statistics of Cholera in Manchester	159
Table VII. Statistics of Cholera in Districts of Manchester	160
Table VIII. Statistics of Cholera in Paisley and Charleston	160
Table IX. Statistics of Cholera in Bristol	162
Duties of Medical Officers, &c. in Dumfries	163
Instructions to Medical Officers in Glasgow	164

APPENDIX B.

Sanitary Report on Epidemic Cholera	3
Cholera preceded by Fever	4
Increase of Zymotic Diseases	5, 6
Inter-relations of Epidemics	7
Progress of Cholera	8
First Cases of Cholera	9-11
Total Mortality from Cholera	12
Cholera in 1832-33 and 1848-49	13
Temperature, Electricity, &c.	14
Definition of Cholera	15
Estimate of Attacks	16, 17
On Cholera Hospitals	18
Influence of Age	19
,, of Sex	20
,, of Occupation	21-23
On the habitat of Cholera	24, 25
Cholera among Hop-pickers	26, 27
Influence of Locality	28, 29
Localities attacked	30, 31
Review of Localities	32, 33
River Localities	34
Influence of Elevations	35
Cholera attacks in Groups	36
Fever and Cholera Tract	37
Cholera in Bethnal Green	38
Localization of Cholera	39
Influence of Grave-yards	40

	PAGE
Defective Water Supply	41
Cholera in Whitechapel	42
„ in Clerkenwell	43
„ in Islington	44
„ in Hackney	45
„ in Westminster	46
„ in Shoreditch	47
„ in Kensington	48
Description of the “Potteries”	49
Benefit of Sanitary Measures	50
Cholera in Lambeth	51, 52
„ in Rotherhithe	53
„ in Marylebone	54
„ in Highgate	55
„ in Hampstead	56
„ in Albion Terrace	57
Evils of Lodging-houses	58, 59
Cellars in St. Marylebone	60, 61
Obstructions to Improvements	62
Cholera among the Troops	63
„ in Prisons	64
Millbank Prison	65, 66
Houses of Correction	67
Newgate Prison	68
Bridewell Prison	69
Model Prison	70
Cholera in Lunatic Asylums	71
Bethlem and Hanwell	72
Remarks on Asylums	73
Epidemics controllable	74
Instance at Berlin	75
„ of Hamburg	76
Model Lodging-houses	77
Expense of Cholera	78
Result of Improvements	79-81
Exemption of Jews	82
On predisposing Causes	83-85
Overcrowding	86
Privy Atmosphere	87
Influence of Animal Effluvia	88, 89
Defective Water Supply	90
Influence of Foul Water	91, 92
Instance of Jacob's Island	93
Contamination of Water	94
Drunkenness	95
Effects of Bad Food	96
Primary Seat of Cholera	97, 98
Cholera a Blood Disease	99, 100
Analysis of Cholera Blood	101
„ of Cholera Stools	102
Existence of a Premonitory Stage	103
Premonitory Diarrhœa	104, 105
Experience of Berlin	106

	PAGE
Experience of Paris	107
Characters of Premonitory Diarrhœa	108-110
Treatment of Diarrhœa	111-114
Neglect of Diarrhœa	115-117
Measures of Boards of Guardians	118-144
House-to-House Visitation	145
Period of Commencement	146
Extent of House Visitation	147
Duties of Medical Inspectors	148
,, Visitors	149
Accuracy of Returns	150
Returns of House Visitation	151, 152
Visitation of Bethnal Green.	153-158
,, in Shoreditch	159, 160
,, in Hackney	161
,, in Clerkenwell, St. Luke's, &c.	162
,, in Whitechapel	163
,, in St. George's, Hanover-square	164
,, in Chelsea, Kensington	165
Testimony of Medical Visitors	166-168
Data for House Visitation	169-171
Lay Visitors	172
Testimony of the Poor	173-176
Review of House Visitation	177
Conclusion	178-180
APPENDIX	181-198

REPORT.

MAY IT PLEASE YOUR MAJESTY,

WHEN in the month of July, 1849, we presented a Report, giving an account of our first proceedings in the execution of the Public Health Act, and the Diseases Prevention Act, which we were appointed to administer, Asiatic Cholera was prevailing extensively in numerous parts of the country, and the epidemic had not yet reached its height. Though fully aware of the imperfection which must unavoidably attach to an account of the pestilence written while it was still extending its destructive course; yet it seemed desirable to promulgate without delay the practical results, as far as they were then obtained, of the measures of prevention and relief which we had deemed it our duty to recommend and enforce. On the first return of cholera, our knowledge of the disease was comparatively limited. Several essential facts had then been scarcely noticed, or were fully appreciated only by a few careful observers, who had taken no means to make them generally known, and other most important points which have since been rendered certain, were at that period wholly unknown: but we could only take for our guidance in the measures of prevention which we were immediately called upon to devise the broadest basis of experience which was at that time available.

The epidemic having now, for the present at least, finished its course, and a large body of evidence having been accumulated respecting it, derived from the whole experience of this country, and in part also from that of other nations, we propose to present a summary of the

results of that experience, with a view particularly to show how far the intentions of the Legislature have been carried into effect, and with what amount of success; and what further legislative provisions are required for the prevention in future of this pestilence, the scourge of modern times, as well as of other epidemic diseases.

We beg to call attention to the full and elaborate Reports of our medical inspectors, Dr. Sutherland and Mr. Grainger, which are given at length in the Appendix. During the whole course of the epidemic they, more than any private practitioners, and more probably than any other public servants, were engaged in a personal and laborious examination of the conditions connected with the propagation of the disease, and in superintending in different towns in various parts of the kingdom, the application of the measures which, on the best consideration, were judged necessary to meet the most formidable attacks of the disease. These Reports, though written independently, and each having a strict and exclusive relation to its respective field of service, will be found to present a remarkable coincidence in regard to the main subjects which are brought under consideration.

Before proceeding to state the results of the late experience of this epidemic, an experience which is more extended and complete than any with which we are acquainted in relation to any other pestilence, it may be useful briefly to describe the course which it took on this occasion, in its progress from India to this country. From Despatches received from time to time by Your Majesty's Government from foreign ministers and consuls, we are enabled to present a tolerably distinct view of its course, from the place of its outbreak to its arrival in Great Britain.

From the time that cholera first appeared in its epidemic form, in 1817, in Hindostan, down to the period of its last great irruption into Western Asia and Europe, the disease had never been absent from some part or other of the Indian peninsula. In the period included in the Parliamentary Returns, from 1825 to 1844, it caused annually nearly one-eighth of the whole mor-

talities of the European soldiers, and nearly one-fifth of all the deaths among native soldiers.

At the beginning of the hot season of 1845 it broke out with great violence in Caboul; it devastated whole districts in Affghanistan and the Punjaub, and committed frightful ravages at Ferozepore and Loodianah, in Northern India. It attacked Umballa in July, 1845, where nearly all the first cases proved fatal, and in the course of the autumn it appeared at Kurnaul, Cawnpore, and other towns.

Some time in the month of November, 1845, small-pox having been extremely prevalent and mortal in the autumn of that year, both in the western and southern parts of the Island of Ceylon, this destructive disease was succeeded by an outbreak of cholera at Taffrea, where it raged with such violence, that out of 4,111 persons who were its first victims, 3,655 perished. This outbreak was there attributed not to any imported infection, but to some endemic influence supposed to have been called forth by the irregular recurrence of the rains in the late season, which, instead of appearing at the accustomed time and continuing for the ordinary period, were much later than usual, and interrupted and partial in their duration. No expectation was entertained of any material mitigation of the disease until the recurrence of the next monsoon, which usually commences to blow from the south-west about the middle of May; accordingly it continued to ravage various parts of the island, especially the districts which had recently been the special seats of small-pox.*

In the early part of 1846 it prevailed extensively and severely in various towns and villages in the southern parts of the Madras Presidency, particularly at Madura and Bellary.

Then advancing in a north-west direction in its progress to Bombay, "an awful visitation," is stated to have taken place at Sholapoor and its vicinity, the disease

* In many of the towns and villages attacked by cholera, in its progress through the Madras Presidency, it was preceded and accompanied by small-pox.

first appearing in the camp of the 33rd Regiment N. I., when on their march to Jaulnah. Spreading thence to the south Mahratta country it almost depopulated several villages in its course; and on no occasion, at least for many years past, had it proved so fatal to the native population.

It subsequently appeared at Poonah, Bombay, and Ahmedabad.

Still steadily maintaining a north-west course it arrived coastward at Scinde, where it first broke out at the sea-coast, and gradually it extended upwards to Hydrabad and Sehwan.

In the month of June an attack of extraordinary severity took place at Kurrachee, at the mouth of the Indus, where the disease is stated to have cut off a tenth part of the population, including 725 European and native soldiers in sixteen days. It is important to remark, that upwards of six months before this violent outbreak, namely, in the month of November, 1845, several sporadic cases of the disease, which proved fatal with great rapidity, occurred in the town.

While the pestilence was raging at Kurrachee, it broke out in Persia, and appeared as early as the month of May with great severity at Aden, at the mouth of the Red Sea, after a violent and unusual fall of rain.

Its progress through Persia was so rapid and fatal as to produce the utmost consternation among the inhabitants of the principal towns of that country. By the month of July it reached Teheran, where, out of a population of 60,000 it destroyed 12,000 persons, 300 deaths occurring daily, for several days in succession. In this town and neighbourhood it attacked with the utmost violence the rich as well as the poor, several members of the Royal Family having been among the first to perish by it.

From Teheran it proceeded by a north-west course to Tabreez, becoming more deadly as it advanced, for out of a population of 30,000, 6,677 persons perished, the greater part within the space of 20 days; from 450 to 500 deaths being reported daily while the pestilence continued at its height.

From Tabreez it turned off in a south-east direction towards Ispahan, which it reached in September, where it committed great havoc among the higher as well as the lower classes. Then, proceeding westward, it reached Baghdad at the latter end of the month, spreading such consternation among the inhabitants, that in a few days the town was deserted; the shops were closed; public offices were unattended, and all business was suspended. In this town and a narrow circle round it its victims are computed to have exceeded 30,000 souls.

From Baghdad, instead of pursuing its westward course, it again turned directly back in a south-east direction, taking the road through Cashan to Sheerez. From this retrograde course a hope was at first entertained that it would not extend its ravages to Europe, since instead of proceeding, as in 1831, in a direct line from India to Europe, through Russia and Turkey, it appeared to be retracing its steps towards the region in which it took its origin.

In a short time, however, all ground for this expectation vanished; for in October it entered Asiatic Turkey, breaking out at Mossul, and reaching as far northward as Diarbekar. At the same time penetrating into Syria, it spread to Damascus, in a few days reached Aleppo, and in the following month (December) it extended its ravages over the whole of the upper Tigris and the lower Euphrates; thence, advancing into Arabia, it reached Mecca early in January, 1847, where it proved so destructive to the Moslem pilgrims, that from two to three thousand of them are reported to have perished by it "in the one night," of their pilgrimage from Mecca to Mount Arafat.

While the pestilence was thus ravaging Arabia and the south-eastern portions of the Turkish empire, it was making steady progress through the southern portion of Georgia, having during the autumn extended its course as far as the province of Derbend, on the Caspian Sea, and to the Russian frontier.

The further progress of the scourge appears to have been stopped by the approach of winter; but early in the following spring it broke out with fresh virulence, pro-

ceeding now in two opposite directions ; first retracing its steps through Trebizonde, Erzeroum, and Baghdad, to Persia, over almost the whole of which country, as well as the greater part of Asia Minor, it again exerted a most deadly influence, and at the same time advancing north-eastward, it ravaged the Russian provinces bordering on the Caspian Sea ; spread throughout the eastern Caucasus, and in the month of June reached, in succession, Tiflis, Keylear, and Astrachan. Thence crossing the Don, it broke out, about the 18th of August, in the port of Taganrog among the shipping, though it had not yet reached Mariapol ; nor did it appear to be advancing along the shores of the Azoph, but rather by the tributaries of the Don, far into the interior of the country, it being reported to have already invaded Lugan and other places of the government of Ekaterinoslav. In the mean time such a panic spread through the country that the current business of the season was suspended ; the crops in many districts, though long ripe for the sickle, were left standing for want of reapers ; and the carriers engaged in bringing goods from Nijni-novogorod abandoned their charge on the way, refusing to proceed southward of the Government of Harkoff.

After entering European Russia it advanced rapidly on Moscow, where it appeared on the 18th of September, 1847, being exactly the same date as that on which it struck the city in 1831.

The disease, on its first appearance at Moscow, did not present a very formidable aspect, nor extend widely over the city ; it confined its attacks chiefly to one particular district near the river. Here, however, it assumed a severe character, for nearly one half of the cases that first occurred terminated fatally.

Its progress north and west was not rapid ; it did not for many weeks extend much beyond the province of Moscow, and at the approach of winter the number of cases in that metropolis became so small, that hopes were entertained that it was altogether subsiding. A very significant fact, however, is stated by Dr. Adair Crawford, namely, that occasional cases continued to occur throughout the winter, affording too much ground for

the apprehension that the malady was only suspended by the cold and dry state of the winter atmosphere, and that it would again break out in spring.

The disease accordingly assumed increased activity about the month of May, extending itself over the whole city, and attacking all classes. The progress of the malady throughout the country became also much more rapid than during the previous year, for it spread almost simultaneously over all the provinces in the empire, north, east, and west, and reached St. Petersburg in the beginning of June, 1848.

While the pestilence was thus extending throughout the Russian empire, it broke out, at the end of June, in Constantinople, committing great ravages in that city, and in several other towns along the Bosphorus, and attacking the upper as well as the lower classes. Appearing at the same time at Odessa, and extending westward along the Danube, none of the persons first attacked in these districts recovered. The outbreak of the disease was here attended by intense heats and enormous numbers of caterpillars and locusts, which destroyed all before them.

About the middle of July, it broke out in Egypt, spreading rapidly over the greater part of the country, 300 attacks occurring daily at Cairo, and from 250 to 300 deaths at Alexandria. At Tantah, a village in the Delta where the pilgrims were assembled, 195,000 in number, 3,000 perished. The ravages of the disease in this country in all the towns and villages it attacked were frightful.

From June to July the pestilence extended its destructive course over nearly the whole of the Russian empire, and at St. Petersburg the people ascribed the appalling number of deaths that occurred in every part of the city to a poisoning of the water, and several riots took place. In Moldavia and Wallachia its prevalence and mortality were so great that it was found necessary to close the courts of law. At Bucharest, business was universally suspended; a general panic struck the inhabitants; and all who could leave the city fled to the mountains.

It has been seen that the disease was nine months in

travelling from Moscow to St. Petersburg; yet having reached the latter city, as has been stated, in the beginning of June, it extended in the following month to Finland and Sweden in its northern, and Riga in its western course. In the same month it penetrated into Prussia and reached its capital; but it does not appear to have manifested itself in Poland until August. In September it spread to Hamburgh and Holland. At the same time several mild cases had also occurred at Paris.

In the beginning of October, it crossed the German Ocean, and broke out in Edinburgh, spreading in the course of a few days to the neighbouring towns of Newhaven, Portobello, Loanhead, and numerous other localities. In the beginning of November it attacked Glasgow, and subsequently a large number of manufacturing towns and villages in Lanarkshire, Ayrshire, Dumfrieshire, and other counties in the south and west of Scotland. From this period the disease may be considered as having established itself in Great Britain, isolated cases, indeed, as will be seen immediately, having occurred at a still earlier period in London and its vicinity.

It thus appears that the first great epidemic outbreak proceeding from Caboul and the North Western provinces of Hindostan, as from a centre, swept over Affghanistan, Persia, and the South Eastern portion of Asiatic Turkey, until it was arrested by the winter of 1846, in its progress towards Europe. It had, up to this date become localised in the North Eastern parts of Asia Minor, from whence, in the Spring of 1847, it again commenced its career spreading in all directions; striking on the one hand the cities of Asia Minor, Persia, Arabia, and Egypt; and on the other Georgia, Circassia, and the Southern provinces of the Russian Empire. The Northern branch of this great outbreak continued its progress until nearly the whole of the Governments of European Russia were affected; after which one portion of it advanced into Finland and Sweden, where it apparently terminated its destructive course; while another branch, after sweeping round the North Eastern

shores of the Black Sea, and nearly decimating the cities and towns of the lower Danube, advanced through Austria into Germany and Hanover, and at the same time attacked the capital of the Turkish Empire. Some idea of the geographical extent of the pestilence, may be formed by the circumstance that it ravaged Constantinople, Berlin, St. Petersburg and Cairo in the same month. Hamburg was attacked on the 7th September; and within three weeks afterwards the epidemic reached the shores of Britain, where, as has been stated, it first appeared at Edinburgh in the beginning of October 1848.

In every European city in which the pestilence prevailed, it gave distinct warning of its approach and intimated by signs not to be mistaken, the severity of the impending attack. An extraordinary prevalence and mortality of the classes of disease which have been observed usually to precede it, foretold its approach and intensity. At Moscow, at St. Petersburg, and in other Russian towns its outbreak was preceded by a general prevalence of influenza and of intermittent fever, the latter disease in many continental cities taking the place of typhus in this country. Diarrhœa also, in the European cities first attacked was generally prevalent before the actual outburst of the disease. At Berlin, intermittent fever, diarrhœa, dysentery, but especially diarrhœa were epidemic. The same diseases, but particularly intermittent fever, scarlet fever, and influenza were prevalent at Hamburg. In London there had been during the preceding five years a progressive increase in the whole class of zymotic diseases, amounting to an excess above the average of 31 per cent.; while the mortality from typhus, which in 1846 considerably preponderated over that of 1845, was still higher in 1847, and exceeded in 1848 by several hundred deaths, the mortality of any preceding year. The deaths from scarlet fever were also greatly above the average, and such was the mortality from influenza, that in 1847 and 1848, almost as many at the earlier periods of life perished by this disease as by the more terrible epidemic that followed it; but the malady which all along continued its course with the most steady

progress, was that which was the most nearly allied in nature to the approaching epidemic, namely, diarrhœa; the deaths from this disease in the five years ending with 1848, amounting to 7,580; whereas in the preceding five years they were only 2,828; while taking separate years in this series, the deaths were in 1848, more than seven times greater than in 1839, and nearly five times greater than in 1841. All these circumstances indicated an epidemic force extending over the metropolis and steadily increasing, which justified the prediction of the Metropolitan Sanitary Commissioners founded on their observation of the increased crowding of the population, its state of filth, its low sanitary condition, and the actual prevalence among the people of the diseases that precede and give warning of the approach of the pestilence, that the impending epidemic would be more severe than that of 1832; and the event has mournfully realized the prophecy.

There were in 1832 no means of obtaining an accurate return of the number of attacks and deaths; nor has there been any return that can be relied on, of the number of attacks in the late epidemic. We adopted all available means to obtain such a return, but we know that the disease was prevalent in several places from which no returns at all have been made, and that in others, the attacks and deaths have been much understated. This was especially the case with watering places along the sea coast, and with places in general whose prosperity depended on the resort of visitors. As an example of this neglect, and the causes which have led to it, Mr. Lee, one of our Superintending Inspectors, states, in his Report on Great Yarmouth, that, in 1832, a great number of persons died of cholera; and during the last year the official returns of the cases and deaths could have no other effect but that of misleading the General Board of Health and the country as to the sanitary condition of the borough.

“There were, I believe, (says the Clerk to the Board of Guardians,) “a great many more cases here than were known. I returned all cases that were sent to me to the Board of Health, *but I believe not one in ten was returned*; the feeling of

most parties being, that if they were published just at the season for watering-places, the town would suffer, as visitors would be afraid to come to Yarmouth."

For England and Wales we have the returns of the deaths from the Registrar-General, and these alone are to be relied on.

With reference to the epidemic of 1832-3, however, we must take the statement as we find it made to the Privy Council, from which it appears that in London, the attacks were 14,144, and the deaths 6,729; the population of London then being 1,681,641. From data given in the Appendix, it is estimated that, in 1848-9, the attacks were about 30,000, and the deaths 14,601; the population at that time being 2,206,076, so that in the last, as compared with the former epidemic, the deaths were more numerous than the attacks, while the attacks were more than double; or to state the result more precisely, in the epidemic of 1832-33, one person died in every 250 of the inhabitants, or $\cdot 4$ per cent.; whereas in 1848-49 one person died in every 151 of the inhabitants, or $\cdot 66$ per cent.; the mortality therefore in 1832-33, was about 2-5ths less than in 1849; which is the same as to say, that in proportion to the population, about 5,800 more persons perished of this epidemic in London, in 1849, than in 1832.

In England and Wales in 1832-33 the attacks are stated to have been 71,606 and the deaths 16,437.

From the Registrar-General's Return it appears that the total number of deaths in England and Wales in the year 1849 was, from—

Cholera	.	.	.	53,293
Diarrhœa	.	.	.	18,887
				<hr/>
Total	.	.	.	<u>72,180</u>

From the total absence of any registration whatever in Scotland, it is of course impossible to obtain similarly accurate data for estimating the extent of the epidemic seizure in that part of Great Britain. Wherever we felt it important to obtain approximate estimates of the amount of mortality, we were obliged to direct Dr. Su-

therland to make a personal examination of the rude entries in the burial registers of the various places of interment likely to have received the dead of those affected districts whose condition we were desirous of ascertaining. The result of this kind of inquiry as to Glasgow was, that about 3,800 persons had died of cholera, and from a consideration of the returns obtained, it appears probable that between 7,000 and 8,000 persons were cut off in Scotland during the course of the epidemic. It may not be far short of the truth to estimate the mortality from cholera, exclusive of that from diarrhoea, in the whole of Great Britain at upwards of 60,000.

The former epidemic commenced in London on February 16, 1832, and ended on September 7, 1833, including a period of about 17 calendar months. But it is stated that during this period there was a total cessation of deaths for eight months, so that if this be true, there were in fact two epidemics, the first commencing on February 16, and lasting to November 30, 1832, and the second commencing on August 1 and lasting till September 7, 1833. The disease in 1832 came to its height in the week ending July 27, when the deaths were 445, which was the greatest weekly mortality recorded during the whole of that epidemic.

In the late epidemic, the first attack is generally considered to have been on the 22nd September, 1848, and the last death recorded in the return of the Registrar-General, is December 22, 1849; so that, according to this account the whole progress of the epidemic occupied a period of 15 calendar months. During the first six months, namely from the end of September, 1848 to the end of March, 1849, the disease advanced progressively but irregularly, numbering in the whole of this period, 988 deaths. During the following months of April and May, there was a lull in the disease; the deaths sinking to one in some weeks, and never in any week exceeding five; but there was never, as is stated to have been the case in 1832, a complete cessation of the disease, for there was never a single week without at least one death; a most significant fact, which as has been shown

had been previously observed during the suspension of the disease in Moscow. In the month of May, the total number of deaths did not exceed 13; but in the first week of June they suddenly rose to 9, increasing in the last week of the month to 124. From that period the epidemic went on rapidly and uninterruptedly increasing till it came to its height in the week ending September 8, 1849; when the deaths, including cholera and diarrhœa, amounted to 2,298. From this time the disease declined and ultimately ceased, as has been stated, December 22, 1849. There was thus one epidemic with two well marked periods; the first extending from September to March, and the second from June to December.

In the first of these periods the highest weekly mortality was 94; namely in the week ending January, 13, 1849; affording during that period a hope of a comparatively slight visitation; but in the second period, this hope was grievously disappointed, for the weekly mortality then rose, as has been just stated, as high as 2,298, independently of 17 deaths from dysentery, namely, in the week ending Sept. 8.

It is proved by the late experience that whenever an epidemic is impending over a country or district, individual cases of the disease generally occur a considerable time before the actual presence of the pestilence is acknowledged. There is a universal unwillingness to believe that the threatened calamity has really taken place; and all classes shut their eyes against the fact as long as possible. The first cases are either concealed, or are recorded under a false name, on the ground that, though they may be suspicious they are of a doubtful nature, and that at all events it is unwise to excite alarm. Thus, though the first recognized case of cholera in London is stated to have taken place as late as September 1848, yet there is undoubted evidence that isolated cases of the true disease occurred at a much earlier period; as far back indeed, as July, when four cases of it are recorded in one single district: these were followed by four more cases in August, in the same district; and these again by two in the beginning of September.

There may have been others in other parts of the

metropolis; but all these unquestionably occurred in Bethnal Green at the dates assigned: while three similar cases also occurred in Southwark prior to the 16th of September; so that the first of these cases occurred upwards of two months, and the last of them nearly a fortnight before the date commonly assigned as the commencement of the epidemic.

The slow and gradual approach of the disease on the metropolis afforded an opportunity of minutely observing its progress, and its mode of invasion.

We have elsewhere stated that, aware of the just importance which is attached to an accurate observation of the first cases that occur on the appearance of an epidemic, with a view to judge of its mode of propagation, we made arrangements for instituting a special inquiry on the spot into every case of cholera that might occur in the metropolis, immediately on receiving the report of it; and that we intrusted this investigation principally to Dr. Parkes, who had had considerable experience of cholera in India. The cases of cholera that occurred in London, it should be observed, were the first, as far as is known, that appeared in Great Britain, being from two to three months earlier than the first case reported in the port of Hull on board a vessel which had come direct from Hamburg.

It appears to us that the history of the progress of the disease in London thus carefully observed is highly important, as illustrating the mode in which it usually attacks and spreads; particularly as the main facts are confirmed by the manner of its invasion of the principal cities of Great Britain.

In order to complete the view of its progress, we repeat what we have stated at greater length in our First Report, that reckoning its commencement at the period commonly assigned to it, the first case occurred at Horsleydown, September 22: eight days afterwards, September 30, two more cases occurred simultaneously, the one at Lambeth, and the other at Chelsea. On the following day, October 1, another case occurred in the City, in Harp-court, Fleet-street; the next day, October 2, a case occurred in a convict ship, the *Justitia Hulk*, at

Woolwich; and three days afterwards, October 5, the disease broke out simultaneously in the seamen's hospital ship, the *Dreadnought*, off Greenwich, and in Spitalfields. From this period the disease steadily extending, by the end of the month there were registered 116 deaths from developed cholera, and 145 from diarrhœa.

The like careful observation has been made of the early cases in several other cities, and its approach and progress were found to be similar.

In Edinburgh, in the beginning of October 1848, two cases occurred simultaneously; one in the underground flat of a house at the top of Leith-walk, and another in Leith in a lodging-house behind King-street. Then two other cases occurred in the same room in the house in Leith-walk in which the first took place. In a day or two it struck two other points in Edinburgh; and at the same time appeared in the fishing village of Newhaven, about two miles distant. Subsequently it attacked by isolated cases, a number of new and distant localities, and advanced very slowly before it became epidemic.

In Glasgow, on or about the 5th of November, 1848, an imported case occurred in a house in Garngad-road, to the north of the city. This case proved fatal; but none of the attendants, and no persons in the neighbourhood suffered, nor was there any connection between it and the subsequent seizures.

Six days afterwards, that is, late at night on the 11th of November, two individuals residing on the ground flat of a damp cottage, nearly two miles to the west of this locality, were suddenly seized with severe diarrhœa, which they both allowed to go on unchecked until the 13th, when one of them was found in a state of profound collapse, and both died; one in the course of the following day. These cases occurred in the city parish, one of the two districts into which Glasgow North of the Clyde, is divided; another case took place simultaneously within the other division of the city, namely, the barony district, which proved fatal on the 13th. On the 14th, 15th, and 16th, three other cases took place in the barony parish. On the 17th a third case occurred in the city parish, at a considerable distance from the first two cases. During

the remainder of the month the disease was chiefly confined to this locality (Springbank) about 40 cases in all taking place in this neighbourhood before the disease began to show itself in the more densely peopled parts of Glasgow.

“From Springbank and its vicinity,” (says Dr. Sutherland,) “the epidemic appears to have spread, as from a centre, towards the east, west, north, and south. On the 5th of December a case occurred south of the Clyde, and on the 9th a case was reported in the west end of Glasgow; and within a few days after this period, the epidemic attacked the whole city, falling upon it like a thunder shower, producing results that baffled all calculation, and setting all existing arrangements at defiance.”

The manner in which the disease invaded Plymouth, Stonehouse, and Devonport, was similar—

“By referring to the Registrar’s book,” (says Dr. Milroy,) “I ascertained that, so far back as the 16th of March, a fatal case occurred in Rowe’s-court, Stonehouse, one of the most disgustingly filthy places I ever visited, and that a month later two deaths occurred from cholera in the same house in Water-lane, immediately adjoining to the former locality. No other case seems to have taken place in Stonehouse, until the 1st of July, nor did the disease become general there for three or four weeks subsequently. In the mean time, however, dropping cases had occurred in Plymouth; and a severe outbreak had taken place at Noss, a small fishing village, eight or ten miles distant, in the beginning of June. The first fatal case in Plymouth was observed on the 9th of June, in the person of a man who had arrived, it was said, in a steamer from Ireland, and had taken up his quarters in a low inn situated in Stonehouse-lane, a place notorious for its filth, and for being a constant *habitat* of fever. The next case occurred on the 16th of the month, in the wife of a respectable tradesman living in a distant part of the town. About the same time, one or two mild cases occurred in other districts. Then, but not for three weeks later, came that terrible outbreak of the pestilence in Stonehouse-lane and the adjacent courts, which caused so much terror and dismay among all classes. So virulent was the poison that between 20 and 30 deaths occurred within three or four days in one court, which consisted of only six small three-roomed houses. Yet it was generally said, especially by the authorities of the town, that the attack had been quite *sudden* and *unexpected*; nor had any precautionary measures been taken, although strong representations on the subject had been

made by the leading medical men of the place many months before. It may be worthy of notice, that none of the early cases of the disease in Plymouth were traceable to any of the passengers who had been landed from the 'American Eagle' in the beginning of June.

"In Devonport the disease made its appearance in the beginning of July at first in solitary cases in an insalubrious locality, and it did not become generally prevalent for three or four weeks afterwards. No one for a moment suspected that the early cases in this town had any mediate connection with those which existed at the same time in Plymouth or Stonehouse."

In Manchester the first death occurred in the second week of June; during the following week there was no fresh case: by the end of the month there had been registered, in all, five deaths. In the week ending 1st July two deaths took place, then there was an interval of a fortnight in which only one death occurred; in the following week, July 28th, eight deaths were registered; but it was not till the latter end of August, that is, upwards of two months from the date of the first case that the disease became decidedly epidemic.

In Dundee, Bristol, Liverpool, Hull, and every town in Great Britain in which the first cases were accurately observed its invasion was similar; so that this approach by isolated attacks, at considerable distances as to place, and intervals as to time, may be regarded as one of the laws of the epidemic. The popular notion that cholera is sudden in its invasion of a place or district, is as unfounded as the former prevalent opinion that it is sudden in its attack of the individual person. Experience has refuted both these opinions, and established the very opposite fact, namely, that, at least in this country, it is gradual and even slow in its approach. And the recognition of this law is of the highest importance in a practical point of view. These isolated cases occurring in any locality during the prevalence of a general epidemic constitution, are unequivocal and certain signs that an outbreak is impending over that place. They are warnings not to be mistaken, demanding the immediate and energetic adoption of preventive measures. Facts about to be stated, the melancholy results of the

late experience, show the dreadful suffering and loss of life which have followed from obstinately refusing to understand the signification of these warnings and to profit by them.

As was anticipated and predicted, cholera during its recent visitation returned to the same countries, and the same cities and towns, and even the same streets, houses, and rooms which it ravaged in 1832. It is true that many places have been attacked in the recent which escaped in the former epidemic, but very few indeed that suffered then have escaped now, except in some few instances in which sanitary measures had in the meantime been effected. In some instances it has reappeared on the very spot in which it first broke out 16 years ago. The first case that occurred in the town of Leith, in 1848, took place in the same house, and within a few feet of the very spot from whence the epidemic of 1832 commenced its course. On its reappearance in the town of Pollokshaws, it snatched its first victim from the same room and the very bed in which it broke out in 1832. Its first appearance in Bermondsey was close to the same ditch in which the earliest fatal cases occurred in 1832. At Oxford, in 1839 as in 1832, the first case occurred in the county jail. This return to its former haunts has been observed in several other places, and the experience abroad has been similar. At Gröningen, in Holland, the disease, in 1832, attacked, in the better part of the city, only two houses, and the epidemic broke out in these two identical houses in the visitation of 1848.

In numerous instances medical officers, who have attended to the conditions which influence its localization, have pointed out, before its return, the particular courts and houses which it would attack. "Before cholera appeared in the district," says the medical officer of the Whitechapel Union, speaking of a small court in the hamlet, "I predicted that this would be one of its strongholds." 18 cases occurred in it. Before cholera appeared in the district, the medical officer of Uxbridge, stated that, if it should visit that town it would be certain to break out in a particular house, to

the dangerous condition of which, he called the attention of the local authorities. The first cases that occurred, broke out in that identical house. In a place called Swain's-lane, in the healthy village of Highgate, near London, there is a spot where the medical officer felt so confident that the disease would make its appearance, that he repeatedly represented to the authorities the danger of allowing the place to remain in its existing condition, but in vain. In two houses on this spot, six attacks and four deaths took place; yet there was no other appearance of the disease during the whole epidemic in any other part of the village, containing 3,000 inhabitants.

Before the appearance of the disease in this country we warned the local authorities that the seats of the approaching pestilence in their respective districts, would be the usual haunts of other epidemics. Our conviction was founded on evidence to which the recent experience has added a degree of force that may be judged of by the following examples.

In the year 1838, a report was presented to the Poor Law Commissioners, describing certain localities in Bethnal Green, in which typhus was then or recently had been so prevalent, that it had attacked in some streets, every house, and in some houses every room. From that time to the present, these localities have been the special seats of fever and of every other epidemic that has chanced to be prevalent. From Dr. Gavin's careful and painfully descriptive Report on the recent progress of cholera in this district, it appears that in one of these places (Old Nichol-street), in 23 houses, 50 persons were attacked with cholera, of whom 33 died, three deaths having taken place in one house and four in another; the visitors finding, besides, nine cases approaching to cholera and 197 cases of diarrhœa. In New Nichol-street, closely adjoining, 21 persons perished of cholera; 30 more were attacked with the same disease who recovered, and there were besides, 2 cases approaching to cholera and 135 cases of diarrhœa. In a neighbouring street, Collingwood-street, six deaths took place in one house. Taking together 99 houses in this immediate

locality, the deaths from cholera amounted to the enormous number of 147; being in the ratio of $1\frac{1}{2}$ deaths to each house. In Beckford-row, in the same district, consisting of 16 houses, there occurred in the year preceding the outbreak of cholera, 23 cases of fever and one of erysipelas; and on the outbreak of cholera, eight persons perished of this disease and two others of diarrhœa.

In one court in Rosemary-lane, Whitechapel, notorious for the number of fever cases constantly prevalent there, out of 60 inhabitants there occurred 13 cases of cholera; that is 21 per cent. of the whole of the population.

In a place called the Potteries at Kensington, where the causes of disease are so concentrated and intense, that during the three years ending December 31, 1848, there occurred 78 deaths out of a population of 1,000, the average age of all who died being under 12 years, and where, in the last year the medical officer attended 32 cases of fever, 21 persons perished of cholera. These deaths took place in the same streets, houses, and rooms which had been again and again visited by fever; and the medical officer pointed out rooms where some of these poor people had recovered from fever in the spring to fall victims to cholera in the summer.

Dr. Milroy says—

“From an instructive report published two years ago by Dr. Cookworthy, the senior physician of the public dispensary at Plymouth, presenting a topographical account of upwards of 2000 cases of fever which had occurred in that town, I find that the two localities that stood highest on the list were Lower-street — where, in 1832, the cholera raged with the greatest violence—and Stonchouse-lane, which was so severely visited last summer.”

Mr. Noble, of Manchester, says—

“The great bulk of cholera cases that have arisen in my district have been in localities distinguished as the *habitat* of fever.”

Much evidence to the same effect has been recorded by our Superintending Inspectors in their preliminary inquiries into the condition of towns petitioning for the application of the Public Health Act. Thus, Mr. Ranger, in giving an account of Barnard Castle, among other instances, states the following:—

"There is one particular house in Galgate notorious for its unhealthiness; whenever typhus is in the town it always prevails in this house; in three years there have been nine deaths in four rooms. There is always an accumulation of filth in the cellar, which the occupiers are in the habit of removing, from time to time, in pails. In this house there occurred three cases of cholera, all of which proved fatal within 24 hours.

"In Swinburne's, alias Peart's-yard, containing 11 houses, occupied by 35 inhabitants, there being to the houses no outlets at the back, and but one privy for the use of all the occupiers, 15 persons died of cholera.

"Mr. W. C. Russell, medical officer of the Doncaster Union, states that cholera, typhus, scarlet fever, measles, whooping-cough, erysipelas, and remittent fever, all prevail in the same localities.

"In Whippingham the cases of cholera and diarrhoea which occurred were all in the fever localities.

In Mr. Rawlinson's report on Wolverhampton it is stated that there are places in the town where fever is unknown and others from which it is rarely absent, and that cholera prevailed in all those places where fever was common. In his report on Alnwick and Canongate, he says,—

"Cholera prevails where fever is common."

Mr. Lee, in his report on Gainsborough, after enumerating between 60 and 70 localities, in which epidemic diseases prevail, observes—

"An awful sacrifice of human life has been long going on at Gainsborough, and the localities are the same whatever may be the epidemic with which the town happens for the time to be scourged."

Of Burslem he quotes the evidence of Mr. Lowndes, Superintendent Registrar, who says—

"The late epidemic, like the visitations which preceded it, has been most virulent and fatal in the dirtiest and most crowded parts of the town; and, as was the case with the 'Irish Immigrant Fever, which raged here two years ago, has thrown heavy burdens upon the ratepayers, and left many widows, fatherless children, and orphans, chargeable to the parish."

Of Nantwich he reports, that in one street, Second Wood-street, in which the general condition of the neighbourhood, the drainage, the construction of the houses, and the state of the privies, are all as bad as possible, cholera had prevailed in most of the houses,

and that in these same houses there was two years since much typhus, there having been in one house nine cases. In another street, Queen-street, where there had been much typhus for several years, cholera prevailed in nearly every house.

Mr. Babbage, in his report on Clitheroe, says—

“From the return of epidemic, endemic, and contagious diseases which is given in the Appendix, it will be seen that these diseases in one form or another are never absent from Clitheroe. The particular form of the disease changes; at one time measles, at another time scarlatina, or at a third time typhus fevers prevail, or these in their turn all disappear, leaving diarrhoea and cholera to supply their place, but one or other of them is always present, and they are generally to be found in the same localities.”

Mr. Clark, in his report on Penzance, in describing an unhealthy district of the town, says—

“It is impossible for words to convey an adequate idea of the filth of this quarter, in which the cholera prevailed formerly, and from which epidemics or diseases of the bowels are rarely absent, and yet the whole stands upon a cliff 20 or 30 feet above high-water mark.”

In Mr. Clark's report on the parishes of Sawtry All Saints and Sawtry St. Andrew, in the county of Huntingdon, Mr. Nicholson, surgeon to the Union, says—

“Medical science has clearly proved that the causes of typhus and other malignant epidemics, are to be found in the putrid gases and effluvia arising from animal and vegetable matter in a state of decomposition: of this truth the Sawtrys furnish a striking example.”

Similar statements abound in all the Superintending Inspectors' Reports.

During the recent epidemic the disease often attacked definite spots in the districts which it invaded, confining its ravages to particular streets, the adjoining streets escaping; and even to one side of a street, scarcely a single case occurring on the opposite side. Thus at Rotherhithe, in a street where numerous deaths occurred, the attacks were almost entirely confined to one side of the street, occupied by respectable private families, the disease appearing in only one house on the other side. “The disease,” says the medical officer of this parish, “passed right through and across several of the streets

“like a cannon ball.” At Bedford, two streets are named as having each suffered on one side severely, the other nearly escaping. At Bristol, and in several other towns, the same fact was observed, and it has been noticed in foreign cities, particularly at St. Petersburg. In this respect also cholera bears a marked resemblance to typhus, yellow fever, and plague.

While the pestilence thus passed over adjoining spots, it sometimes attacked places in groups; that is, it seized on a certain number of courts, alleys, or streets, decimated their inhabitants, then ceased, and broke out in a similar manner, often at the opposite extremity of the district, occasionally returning again, after an interval, to the first locality. In this manner the occurrence of six, eight, or even more deaths was not uncommon in a particular house; but such a house did not form a centre from which the disease spread to neighbouring houses, and thence over the district. On the contrary, simultaneously with the attack in this particular house, or as soon as the work of death had been accomplished in it, the disease broke out afresh at a considerable distance, the intervening houses escaping. The preceding history of its progress from Asia to Europe, and through the several countries of Europe, shows that it advanced not by a strictly contiguous progressive and uninterrupted course, but that at one time it sprung at a single bound over a vast tract of country, while at another time its course was retrograde. Its progress through a city was similar, there being in general no regular continuity in its course, but its progress consisting in a succession of local outbreaks. Hence, in the course of the house-to-house visitation, the disease having disappeared from one district, the medical staff were obliged to follow it to another, and thence to a third, and so on from district to district till the whole epidemic-seizure was at an end.

With reference to the principal seats of the pestilence in the metropolis and their comparative mortality, it appears that in both epidemics the disease was localized in precisely the same districts, but that several of these have changed places in regard to the relative degree in which they have suffered.

Thus estimating the intensity of the epidemic force by the amount of mortality from cholera and diarrhœa, proportionably to every 1,000 living, it appears that Rotherhithe, which was the first in the order of mortality in the late, was only the ninth in the former epidemic; Bermondsey, the second in the late, was the fourth in the former; Southwark, the third in the late, was the first in the former; and Newington, the fourth in the late, was the sixth in the former epidemic, and so on.

The greater severity of the late as compared with the former epidemic is exhibited in a striking manner in the tables contained in Mr. Grainger's Report, pp. 30 and 31, (Appendix B.,) from which it appears, that taking six districts in the order in which the mortality was the highest in both epidemics, the proportionate mortality in the former as compared with that of the late epidemic was relatively in the first district as 12 to 29; in the second as 11 to 22; in the third as 8 to 18; in the fourth as 7 to 16; in the fifth as 5 to 13; and in the sixth as 4 to 11.

The tinted cholera map of London in Mr. Grainger's Report, intended by the depth of the tinting to represent to the eye the places on which the violence of the disease principally fell, taken in connection with the various tables appended, may suffice to show the progress and the relative intensity of the epidemic as far as locality is concerned.

"Of the parishes of Bethnal-green and Shoreditch," (says Mr. Grainger,) "more exact maps have been prepared, under the direction of Dr. Gavin, resting on his own investigations, by which every death from cholera has been traced not only to the particular street in which it occurred, but even to the individual house. Two striking facts present themselves in reviewing these tables; first, that the localities south of the Thames have been the main seat of the epidemic; second, that the districts bordering both sides of the river have collectively suffered much more than those removed from the stream. Thus, out of the 10 parishes and unions in which the percentage of deaths is highest, eight are placed on the south of the river; whilst in all the southern districts, with a population of 585,067, or 26·5 per cent. of the whole population of the metropolis, no less than 8,200 deaths, or 48·8 per cent. of the whole mortality, occurred; as regards the districts skirting the two sides of the river, their population amounts to 947,936, or

42·9 per cent. of the whole, the deaths being here 9,966, or 59·3 per cent. of the total mortality.

“The tables of Mr. Edwards show, in detail, the influence of locality on persons of various ages, and in the three principal ranks of life; and the following extract from the remarks of that gentleman will suffice to illustrate the subject:—

“These tables (see Appendix, Nos. 2 and 3) are important as indicating, that where there are defective sanitary arrangements there will be found an excessive mortality. It shows that in wealthy districts, where attention is paid to proper sewerage, and where cleanliness is observed, there, comparatively speaking, cholera has been harmless; and that where there is an almost total want of the appliances to health the epidemic has been most destructive.

“If merely two districts of the metropolis are compared, viz., the north and south, the difference is most striking. The population at each age has been taken as given in the census of 1841, for both districts, and the relative proportion of mortality to the living at each quinquennial period shown, and, in every instance, a fearful difference is indicated on the side of filth, overcrowding, and defective drainage. In the north district the mortality at all ages was only ·26 per cent. to the living, whilst in the south it was 1·47 per cent., or nearly six times greater; but if the mortality at each age is taken together with the population, the difference is still more apparent. Thus, in the following table, it is made clear that at every period of age there is a considerable excess, which is more marked as the ages progress: thus, from 60 years of age and upwards in the north district, only 1 per cent. of the population died, whilst in the south 3·9 per cent. perished, showing a difference against the south district of 2·9 per cent., or 29 in 1000 living; thus demonstrating that the south district contains in itself an immense amount of exciting causes of disease.

“It should also be borne in mind that the south district embraces many localities which are proverbially healthy, such as Dulwich, Norwood, Brixton; and the great excess therefore arises in those districts where there is defective sewerage, overcrowding, &c.; such as parts of the parish of Lambeth, the parishes of Bermondsey, Rotherhithe; St. Olave, St. Saviour, St. George, Southwark; and Newington.

“The excess of deaths, therefore, in these particular parishes, must be considerably greater than has been stated above.”

“By referring to the tinted map of London, which shows the more precise seat of the mortality in each district, the intimate relation existing between the activity of the disease and proximity of the river will become still more apparent; the dark colour, which indicates the relative mortality, showing, even at

a distance, the general course of the Thames. A similar effect was produced by the river Lea, as it runs through Hackney Union: thus, in a cluster of cottages at High-hill Ferry, where, however, other causes of insalubrity also operate, Dr. Gavin states six deaths took place, besides which 84 cases of choleraic diarrhoea were discovered during the house-to-house visitation."

We have elsewhere called attention to the atmospheric changes which usually precede and accompany the outbreak of great epidemics. These changes, though observed from ancient times, have not yet been connected by any precise relation with the origin and progress of pestilence. Recent experience has added but little to our knowledge of this subject. At St. Petersburg, the electricity of the atmosphere appears to have been disturbed in a remarkable degree during the whole course of the epidemic, being so much diminished that machines could not be charged. The magnetic force was also diminished; but these phenomena were not general. At Berlin and Hamburg express observations were made, which showed that the magnet had lost none of its power. In London, during what may be regarded as the cholera quarter, thunderstorms were frequent, and the air was unusually dry; but the magnets were seldom disturbed, and the amount of electricity, though less than usual, seems to have diminished only in proportion to the less amount of humidity of the air.

Along the Danube, and in all the eastern countries devastated by the pestilence, the disease was in general at its height when the heat was most intense, the temperature being everywhere unusually high. In London, also, at the period when the pestilence was most prevalent and mortal, that is, from the middle of August to the middle of September, the temperature was, without exception, high. The air was also unusually stagnant. It is stated by Mr. Glaisher of the Royal Observatory, Greenwich, that the horizontal movement of the air during the whole of this period was only one-half of the usual amount; that the period was distinguished by a thick stagnant atmosphere; that the air was, for the most part, very close and oppressive, and that, on some days, when there was a strong breeze blowing at the top of the Observatory at Greenwich, and over Black-

heath, there was not the slightest motion in the air on the banks of the Thames.

With due allowance for difference of climate, apparently consisting chiefly in difference of temperature, and of the hygrometrical state of the air, there is a remarkable coincidence between this description of the atmosphere of London and that given by Mr. Thom of the atmosphere at Kurrachee, some time before the dreadful outburst of cholera in that town:—

The climate of Kurrachee during the weeks preceding the appearance of cholera among the troops was characterized by several peculiarities different from those which generally belong to all hot countries and seasons, perhaps merely so by their presence being in an excessive degree. First, the temperature was unusually high, being 90° to 92° in the day-time, and 86° at night in good houses, and in the tents of our soldiers it rose to 96° , 98° , and 104° , as indicated by a thermometer suspended on a central pole 5 feet from the ground, and in a thorough draught between the doors. Secondly, the quantity of moisture in the atmosphere was greater than I ever saw it before in any part of the world, or at any season, the dew point being at 83° , and the thermometer in the shade at 90° , the lowest range; even this gives 12.19 grains of vapour in each cubic foot of air. The mean heat in the 24 hours was such as to suspend an unusually large proportion of vapour in the air, always near, but rarely or ever reaching the point of deposition. Even at the Equator, with the sun overhead, I never saw the point of deposition above 78° . The third, and perhaps most important circumstance worthy of notice in connexion with the other two, was the light, weak, and unsteady winds or calms which prevailed in the early part of June. Now this is exactly the reverse of what ordinarily happens. In the last two years the months of June and July were remarkable for the strong, steady winds and overcast sky, which has given so favourable a character to the climate of Kurrachee during the hot months. It also appears that the quantity of rain which fell during the prevalence of cholera was much beyond anything that had occurred for a long time before, at least it surprised the European officers who had been there for three or four years. The effect of all this on the bodily feelings of every one, even the older residents in India, may more easily be conceived than described. There was a sense of languor and oppression, a stifling feeling about the respiration, and inability to undergo the slightest fatigue without extreme exhaustion. It was impossible to sleep at night, yet during the day the tendency to be overcome by a torpid sort of sleep

was universally complained of; the body was bathed in perspiration, and the skin was corrugated and thickened, as if it had been immersed for a long time in water. The lightest clothing could hardly be borne, or anything that arrested the free communication between the skin and the air. Hence every one was forced to seek the open air out of doors, or some place where the weak breezes were turned into a sharp draught; and it was a luxury of no common kind to have a punkah. In fact for 10 days before the predictions were unhappily fulfilled, it was a common remark among "old hands" that it was regular "cholera weather."

Upon the whole the general result of observation and experience is, that the natural physical condition of the air which is the most conducive to the production and propagation of cholera is a hot, moist, and stagnant atmosphere, especially when immediately preceded by the prevalence of cold and dry winds. Hence the central part of India is stated to be the most subject to cholera, probably on account of its higher temperature; and the earlier and more constant occurrence of the causes that give rise to the south-west monsoon, or sea-breeze of the hot months, that is, a hot wind saturated with moisture. Mr. Thom endeavours to trace a condition essentially similar in the climate of all the tracts of inhabited land over which cholera has travelled.

"For," (he says), "Affghanistan, Persia, Turkey, Southern Russia, and Central Europe, form a chain of countries which are exposed to alternations from cold and dry to hot and moist currents of wind, resembling those of the Indian Peninsula, but in a modified degree, except in extraordinary hot years, when the similarity will be perfect; and it is by this route that cholera has usually found its way from the north-west of India to Europe. As to its contagious nature, I believe that has been long ago satisfactorily denied by almost all medical men; and this opinion will be shown to have been corroborated in a remarkable manner during its late outburst at Kurrachee. I cannot now quote authorities, but I think it will be an easy task to show that many of the great recorded plagues, especially those called the "black death" and "sweating sickness," "mort du chien," were true cholera, or modifications of it: that these so-called plagues have chiefly visited the kingdoms of Persia, Asia Minor, and Europe, or those regions most likely to be influenced by the atmospheric phenomena to which I have devoted so much attention."

The extreme oppression caused by an elevated tempe-

rature with an atmosphere charged to saturation with moisture has been just described. In such a condition of the atmosphere some of the main excretory functions of the body, particularly the exhalations from the skin and lungs, must be to a great degree suppressed, and a proportionate poisoning of the blood by the retention in the system of matters which ought to be eliminated from it, is inevitable. How much this state of things is aggravated by the absence of wind, and a consequent stagnant condition of the atmosphere, is illustrated by Indian experience, where, from experiment, it appears that from a surface equal to a disc of six inches in diameter, with the dew-point at 83° , and a temperature at 90° in the shade, the evaporation per minute would be equal to half a grain in a calm, 1.40 in a moderate breeze, and 2.10 in a brisk wind, thus making the quantity of fluid removed from the system to be nearly three times as much in a moderate breeze, and upwards of four times so in a fresh wind, as in a calm or stagnant state of the atmosphere.

It is important to bear in mind that these physical conditions of the atmosphere which thus oppress the vital powers are the very conditions under which noxious animal and vegetable refuse decompose with the greatest rapidity, and in which the products are carried in greatest quantity into the blood by the respiratory organs.

But these atmospheric conditions can be regarded only as powerful accessory causes, acquiring peculiar force in a climate in which they are so intense as in India; but by no means as the sole or essential causes, since the pestilence has prevailed extensively and severely in countries and seasons in which such atmospheric conditions do not exist, as in Scotland during the intense frost of January, and in the metropolis in the unusually dry state of the atmosphere described by Mr. Glaisher.

During the late epidemic when the pestilence actually broke out in any locality it spared neither sex nor age. In London the larger proportion of its victims appears to have been males. The return of the Registrar-General for England and Wales, in the year 1848, also shows a greater mortality from this disease among males than females, the deaths among males being 1057, and among

females 877. In some cities, however, as in Glasgow, from causes hereafter to be assigned, there is reason to believe that females were the greater sufferers.

A very large proportion of its victims were in the prime of life. Out of 2,322 attacks and 1,058 deaths occurring at Glasgow, in which the ages were carefully taken, the numbers attacked between 20 and 40 (1,148) were more than double those up to 20; between 20 and 50 the numbers more than doubled those who suffered in all the other periods of life put together. Taking the whole of Glasgow, the number of deaths between the ages of 20 and 40 were 50 per cent. of the entire mortality; but in London the proportion was only 33·6 per cent., the reason of this difference probably being, that at Glasgow great numbers of immigrants at these ages annually throng into it, whose premature deaths regularly swell, beyond the ordinary average, the proportion of those who there perish in the prime of life. At Berlin, also, it was observed that by far the greater number of the cholera victims were between the ages of 20 and 40. In this tendency to seize on persons of mature age cholera confirms the observation formerly promulgated in regard to typhus, that it seizes on persons in the most productive periods of life; both able and willing to work; the very strength of the country; many of them parents of young and increasing families, who are suddenly cut off by a great, and what all experience has proved to be, a preventible calamity; and this fact assigns the reason for the larger amount of widowhood and orphanage, and consequently of pauperism, produced by both diseases.

The recent experience has afforded fresh and conclusive evidence that the attacks of the disease are not confined to the weak and sickly, but that great numbers of its victims are among the healthy and vigorous. No robustness of constitution was found a security against the pestilence under exposure to powerful predisposing conditions; and, on the other hand, in the absence of such conditions, the feeble and sickly escaped as well as the strong.

Mr. Thom expressly states that it was the tallest and

strongest men that suffered most in the outbreak at Kurrachee.

“ It seems,” (he says) “ as if the disease had travelled along the front ranks of these. Indeed, throughout the regiment, it was the most powerful, muscular, and robust men that most speedily, and generally, fell victims to the malady. Any one who ever saw the splendid men in our flank companies, and will inspect (Table F) will quickly appreciate the truth of this. It was indeed a sight never to be forgotten, to behold the powerful frames of the finest men of a fine corps, who had that morning been in apparent good health, and most of them on the evening parade, as if at once stricken down, and striving with the last efforts of gigantic strength to resist a death-call that would not be refused.”

Abundant evidence has refuted the common notion that cholera is particularly prevalent and fatal among the extremely poor. The chief sufferers in the recent epidemic were not paupers, but independent labourers, artisans, and the lower grade of shopkeepers; classes generally not destitute of food and clothing. In particular localities it was also fatal to the police and to soldiers. But some attacks occurred of extreme violence under circumstances in which want cannot be supposed to have formed a predisposing cause. In an establishment in the Hackney-road, for example, out of 96 inmates, young women in the prime of life, having abundance of excellent food, and in the possession of ordinary health, no fewer than 40 were seized with cholera, of whom 15 died, that is, 15 per cent of the whole number of the inmates of this asylum perished. These facts are in accordance with the observation that typhus is sometimes most rife in periods of the fullest employment.

It is remarkable that a large proportion of the attacks both in this country and abroad, took place at night. This was so much the case at Hamburg that, during the height of the epidemic, people were afraid to go to bed. The general impression of the medical officers in London is, that a large proportion of the seizures took place some hours after the patients had retired to rest, having eaten a hearty supper. From a table supplied by Dr. Alexander M. Adam, of Glasgow, it appears that out of a given number of cases recorded in that city

there occurred, between the hours of 8 P.M. and 8 A.M., 140 attacks and 65 deaths, as compared with 85 attacks and 53 deaths occurring within the corresponding 12 hours of the day.

It is also stated by Mr. Thom, that at Kurrachee many more men were attacked at night or in the early morning than during the day.

During the epidemic of 1831-2 it is stated that numerous instances occurred in which an infected individual came into a healthy locality, and that the disease soon afterwards attacked other persons in the house or immediate neighbourhood in which the infected individual resided, and spread from thence as from a centre.

No instance of this kind has been brought under our notice in the progress of the late epidemic. In all cases where the facts have been carefully observed on the first appearance of the disease in a new locality, which is the only period when the observation can be made, it has appeared to attack and spread epidemically, and not by the contact of the sick with the healthy.

When, for example, in the month of September, 1848, cholera broke out in the port of Hull, on board the "Pallas," the vessel was closely wedged in among others, and the seamen actually slept two nights in the town after the occurrence of the cases of cholera, and before the vessel was placed in quarantine, yet the disease did not spread to neighbouring vessels, nor extend into the town. Subsequently several other vessels arrived from Hamburg under similar circumstances, many fatal cases occurring on board, but in no instance was disease communicated to any other ship or to any individual. On the other hand, nearly a year afterwards, when there was no cholera in Hamburg, and no importation of the disease from any other place, cholera broke out violently, and spread extensively through the town. Dr. Sutherland, who, after a careful examination of the health of the town when the disease had been imported, arrived at the conclusion that there was no ground for the apprehension of an outbreak of cholera at that time, but who, on examining the health of the town ten months

afterwards, regarded it as in imminent danger, and warned the authorities of the impending outbreak, says,—

“ I look upon the evidence of the non-contagious nature of cholera, and of its dependence upon an epidemic constitution and suitable localizing circumstances in the population, as afforded by the whole history of the disease in Hull, to be perfectly conclusive.”

In numerous instances individuals arrived in uninfected localities with the disease upon them, and died without communicating the infection to any one, and without the spread of the disease.

The first fatal case in Dundee, for example, was in a man who was brought ashore from a small vessel in the Tay, in which he had arrived from Alloa on the Forth. In neither town was there any cholera; the patient was seized on the passage, and died shortly after he was taken to the hospital, on the 12th September, 1848. Cholera did not become epidemic in Dundee till July in the following year.

The first fatal case of cholera took place in Hull on the 23rd August, 1848. Another fatal case occurred on the 9th September. One or two other cases followed at intervals, but the epidemic did not appear in force till nearly a whole year from the occurrence of the first fatal case, and it then committed the most dreadful ravages.

The first fatal cases of cholera in Liverpool were imported from Dumfries on the 10th December, 1848; they occurred in an Irish family, consisting of a man, his wife, and six children, three of whom died of the disease. The fourth case occurred in a woman who had been engaged in attending on the deceased: she was seized on the 14th, and died next morning. It has not been ascertained whether this woman had previously suffered from diarrhœa, but the case was by some considered as affording an illustration of the extension of the disease by contagion. It must be borne in mind, however, that the disease broke out at the same time in another Irish family, which had no communication with the family in question, three deaths occurring in the second family in rapid succession. After this period

isolated cases of the disease took place, occurring in different parts of the town, but it did not assume a decidedly epidemic form for several months afterwards.

On a careful and minute investigation of the first 28 cases that occurred in London, there was conclusive evidence that no communication whatever took place between the infected individuals. At Glasgow, the same observation was made. The parochial surgeon of the district in which cholera first broke out states, that no communication could be traced between the individuals first affected; and that 21 cases occurred under his own charge before he saw an example of two persons *consecutively* attacked in the same house or even in the same neighbourhood, that is, in the same street or lane. In 13 instances relatives lay in the same beds with the sick without being affected. In 9 cases children were suckled by women labouring under the disease, and yet not one of them was attacked.

In numerous instances a person in sound health and living habitually in a pure atmosphere, on going into an infected locality and remaining there a short time, but without seeing or holding any intercourse with an infected person, imbibed the poison, went back into the country, and there sickened of the disease and died. In no instance that has come under our notice did such an individual communicate the disease to his nurse or to any member of his family, and in no case was his return followed by the spread of the disease in the neighbourhood.

It is true that instances were reported of nurses in attendance on the sick catching the disease and dying; and several alleged facts were recorded in the Registrar-General's Returns, with reference to the metropolis, to the effect, that the death in question was that of a washerwoman who had washed the clothes of an infected person, and who immediately afterwards had sickened and died.

We made a careful examination into all the cases that were brought under our notice, in which nurses were reported to have caught the disease from a close attendance on an infected person. In every case thus inves-

tigated, we found either that the nurse had been previously suffering under premonitory diarrhœa, in some instances for several days together, which she had neglected; or that she had committed some act of intemperance, or was exhausted by over fatigue; predisposing causes to the powerful influence of which attention will be called immediately.

With reference to the cases of the washerwomen, we directed a special inquiry to be made into every instance of this kind reported in the Registrar-General's Returns. Dr. Waller Lewis ascertained the facts of the case in each instance by personal investigation on the spot. From Dr. Lewis's Report, it appears that some of the statements were wholly without foundation, the person in question never having washed any clothes at all; and that in other instances, though clothes had been washed, the individuals in question were previously labouring under premonitory diarrhœa, which they neglected, while they were, at the same time, living in infected localities, and some of them in houses and even in rooms where the disease had been or was then prevailing.

We submit that an attentive consideration of the course of the disease from nation to nation is not favourable to the view of its propagation by contact from person to person. But an inspection of the dates when the disease first made its appearance in the several towns and cities of this country is still more decisive against this opinion. For example, on its first outbreak in 1848 cases of it occurred, as reported to us, on the same day at Lasswade, near Edinburgh, Sunderland, and Hounslow; on another day at Falkirk, Tynemouth, and Chelmsford; on a third at Greenock, Preston Kirk, Monckland, Blantyre, Thornhill, and Cambridge, and the like instances might be multiplied to a great extent. (*See Table B.*)

We beg to call attention to one important practical conclusion to be derived from these and similar facts. It has been stated that the first case of this disease is generally considered to have occurred in London on the 22nd of September, 1848, but we have shown that undoubted cases of it existed in the metropolis at least two months previously to this period, and that isolated cases of it

continued to recur at different times in widely distant districts up to the 22nd of September. Had quarantine been practicable in this instance, and had it been put in force on the very day that the first commonly recognized case of the malady occurred, it can hardly be conceived that it could have answered any useful purpose, since the disease had been already undeniably in the metropolis, and incubating there, in several different localities, two months previously.

The occurrence of isolated cases many months before the general outbreak of the disease has been observed in other countries. Such cases occurred at Moscow and St. Petersburg, and as has been stated, at Kurrachee, before the terrible outbreak in that town. Mr. Thom states that a single case of cholera, but a pure and genuine attack, proved fatal at Kurrachee eight months before the general outbreak. Two or three cases subsequently occurred after a lapse of about two months; this was followed by several others after another period of two months, and then "there was no further spread of the malady till the "awful visitation in June," some months subsequently.

We submit that the law of the disease, exemplified by these and other instances, that it spreads not by continuity of time or place, but that it occurs at irregular periods, and extends by a succession of local outbreaks, is a decisive proof that it is propagated not by the contact of one infected person with another, but by a general influence operating on particular localities and persons, according to certain localizing conditions and predisposing causes.

The experience of the recent epidemic has afforded, perhaps, the most definite and impressive evidence of the influence of these localizing conditions and predisposing causes that has been yet observed; and we cite the following examples of it, in the hope of directing attention to the vast mass of evidence to the same effect which is detailed at length in the reports given in the Appendix.

OVERCROWDING.—Without a certain quantity and quality of air life cannot be maintained. When a number of persons are crowded together in a small space, without the constant admission of fresh air, they are exposed to a double evil; they are deprived of the necessary quan-

tity of air, and what air they do breathe becomes more and more vitiated at every respiration. It is found by experience that unless extraordinary means are taken for the constant renewal of the air by some special apparatus for ventilation, health and strength cannot be maintained in a breathing space of less than from 700 to 800 cubic feet, and that to live and sleep in a space of less than from 400 to 500 cubic feet for each individual, especially during the prevalence of an epidemic, is not compatible with safety to life. Some conception may be formed of the extent to which the atmosphere must necessarily become vitiated when a number of persons are confined together in a small space without the means of renewing the air, from the fact that the skin and lungs exhale at each moment a definite and measurable quantity of poisonous gas (carbonic acid gas) together with a certain amount of animal matter of a highly putrescent nature, the existence of which is demonstrated by condensing the vapour in which it is suspended as it passes from the lungs. It is found that this putrescent animal matter, if it is not allowed to escape, is deposited on the walls of living and sleeping-rooms, and clings to articles of clothing, bedding, and other furniture, and is the source of the nauseous smell perceived on entering dirty and crowded dormitories, living-rooms, school-rooms, and other places of public resort. Under confinement in such a place the most robust health gives way, and the extent to which the habitual respiration of its atmosphere destroys the resisting power of the constitution and predisposes to disease, becomes manifest in an appalling manner when such a place happens to be invaded by an epidemic influence. Of the many proofs of this afforded by late experience it may suffice to cite the following:—

“In the beginning of June, 1849, a sudden and violent outbreak of cholera occurred in the workhouse of the town of Taunton. No case of cholera had previously existed, nor did any subsequently take place, among the general inhabitants of the town, though diarrhœa was prevalent to a considerable extent. The workhouse is badly constructed, the ceilings of the rooms being in general not more than 8 feet 9 inches in height, and the ventilation extremely defective. Into the girls’ school-

room, a slated shed, 50 feet long, 9 feet 10 inches broad, and 7 feet 9 inches in height to the top of the walls, the roof being sloping, there were huddled 67 children. Each child had, therefore, for respiration only about 68 cubic feet of air. The epidemic influence which was pervading the district struck this establishment. On November 3rd, one of the inmates was attacked with cholera; in ten minutes from the time of the seizure the sufferer passed into a state of hopeless collapse. Within the space of 48 hours from the first attack 42 cases and 19 deaths had taken place, and in the course of one week 60 of the inmates had been swept away. 'A curious circumstance,' (says Dr. Sutherland), 'occurred with respect to the boys' school. This apartment was rather worse than that of the girls; but the boys, who were good and obedient in other respects, could not be kept from breaking the windows. In the girls' school the windows were never broken; and the chaplain of the workhouse states his firm belief, that it was to the better ventilation, which the broken windows maintained in the boys' school, that the children in some measure owed their lives."

A similar outbreak occurred in the parish of East Farleigh, near Maidstone, among the hop-pickers engaged at a farm on which about 1,000 persons of all ages were employed. As an example of the manner in which these people were lodged, it is stated, that in a room containing 700 cubic feet 14 persons slept, so that each individual had for respiration about 50 cubic feet of air. Within four days after the first seizure of this population there had occurred upwards of 200 cases of diarrhœa, 97 of developed cholera, and 47 deaths.

Precisely similar was the outbreak among the pauper children at Tooting, where each boy had for respiration in the dormitory 150 cubic feet, and each girl 133 cubic feet; the windows of the girls' dormitories small and few, being closed during the night, the doors shut, and the chimney-places boarded up. Before cholera had decidedly manifested its presence in London, and while its existence was doubted, and even denied, out of about 1,000 inmates in this establishment, 300 were seized with cholera, and 180 died.

Mr. Grainger states, as the general result of his observation of the late epidemic in the metropolis, that the force of the disease was in the ratio of the overcrowding, all other circumstances being the same.

“Thus,” (he says,) “among the workhouses of the metropolis, although the official returns relating to them have not yet been received, it may be stated that the attacks were the most numerous in those establishments in which the wards were the most crowded and defective in ventilation. As an example of this may be mentioned the workhouse of Shoreditch, which suffered most severely; so that among the inmates 109 cases of cholera, 61 terminating fatally, besides a large number of diarrhœal cases, occurred between December 1848, and September 1849. This house is in all the older parts most defective in construction; several of the dormitories and other rooms were found, when inspected by Dr. Arthur Farre and myself, in the beginning of 1849, to be low, dark, and ill-ventilated. In reference to the above attacks, the medical officer, Mr. Clark, says—

“‘I am convinced that wherever large numbers of human beings are congregated together, and who eat, drink, and sleep in the same apartment, as is the case of the young and old in workhouses (among which classes diarrhœa has in our house been most prevalent), there the inmates are most liable to suffer.’”

“In a most fatal outbreak, occurring in a large establishment for pauper children, and to which the public attention was at the time painfully directed, it was observed that the girls suffered more than the boys; and yet the former, as is usually the case in such institutions, were in better condition than the latter. On investigation it was found that the girls’ dormitories were more overcrowded, and much worse ventilated, than those of the boys; and this was the only difference I could discover to explain the greater number of attacks in their case.

“Several instances of a similar kind to the last occurred among the general population. This was the case, so far as could be learnt from a careful investigation, in the place called Jennings’-buildings, Kensington.

“The Committee of the Academy of Medicine of Paris, in their instructions to the people, place the avoidance of overcrowding at the head of their precautions:—

“‘The first, and without doubt the most important care, is to maintain around each person a pure atmosphere, experience having shown that those who neglect this precaution in the time of the epidemic are the most exposed to be attacked by it; consequently persons should avoid as much as possible sleeping in too great numbers in the same room,’” &c.

But the most striking effects of overcrowding are seen in climates where the conditions of disease are the most intense, as in India. It is stated by Mr. Thom, that in the native town of Kurrachee, which consists of mud

houses, with mere crannies as windows, where the houses are built so closely together, and the streets, barely wide enough to allow a loaded camel to pass, are so very tortuous and inaccessible to currents of air, that all ventilation must be arrested unless during a perfect gale of wind, out of 15,000 inhabitants, 1,500, or 1 in 10, died of cholera; whereas in the bazaar, which is inhabited by the same description of persons, but which is laid out in large compounds, divided by wide streets, straight and at right angles to one another, the houses and stores being well-built, so that the general ventilation of the place is secured, the proportion of deaths was only, 1 in 30. He also states:—

“That when cholera showed itself in Hyderabad, in 48 hours it carried off 96 out of about 400 prisoners who were confined in a very imperfectly-ventilated gaol, and that almost every ship carrying coolies from Calcutta to the West Indies was attacked with cholera in the first fortnight of the voyage: these poor creatures in all probability labouring under a choleraic diathesis on shore, by sleeping in the open air did not suffer; but no sooner were they cooped up on board a vessel, and hundreds of them shoved down into the ‘tween decks,’ at night at least, or in the day time also if the weather was bad, than they got cholera.”

FILTH.—When an atmosphere contaminated by the emanations that arise from filth accumulated in and about dwellings is respired, the noxious matters dissolved or suspended in the air are carried directly into the blood. The extent to which such matters may poison the blood may be understood when it is considered that in the space of every 24 hours an adult person breathes 36 hogsheads of air; that there pass at the same time through the lungs, to be brought into contact with this bulk of air 24 hogsheads of blood; and that the velocity of the circulation is so great that the whole mass of the blood is carried round the body in one minute.

Yet no just appreciation is generally entertained of the importance to health and life of the purity of the air that is habitually breathed. At the present day the power of effluvia from decaying animal matter to injure the health, is doubted and denied, even by some medical men; and a conception may be formed of the state of

knowledge on this subject among less educated persons from the following statement :—

“It may appear almost incredible,” (says Mr. Grainger,) “that, by many persons even of the middle ranks of life, the foul exhalations of privies, stables, and cow-stalls, are deemed to be innocuous, or even beneficial; and yet it is certain that such opinions are by no means rare. I have heard in a London Board of Guardians the argument maintained, that the effluvia from a cesspool could not be noxious because the speaker, who was advanced in years, had lived close to one all his life. In one of the eastern counties it is deemed to be a beneficial thing for children labouring under *hooping-cough* to hold them over a privy ‘early in the morning.’ A more prevalent opinion is that the air of a cow-stall, no matter how many animals are crowded together, is particularly advantageous, especially in consumptive cases. Even by many of those who have paid some attention to the sanitary question, the grosser and more palpable contamination of the air of towns by smoke has attracted more general attention, and has given rise to more stringent legislation for its removal, than the infinitely graver evils arising from those subtle, invisible, but all-powerful effluvia, proceeding from decomposing organic matter, whether animal or vegetable, which, in a multitude of different, and, by the general public, little-suspected ways, lay the foundation for those diseases which so frequently debilitate or destroy numbers of the labouring classes.”

It is therefore still not unnecessary to call attention to the evidence, which recent experience has afforded, with reference to this subject.

Immediately opposite Christchurch workhouse, Spitalfields, belonging to the Whitechapel Union, and only separated from it by a narrow lane, a few feet wide, there was, in 1848, a manufactory of artificial manure, in which bullocks’ blood and night soil were desiccated by dry heat on a kiln, or sometimes by mere exposure of the compost to the action of the sun and air, causing a most powerful stench. The workhouse contained about 400 children, and a few adult paupers. Whenever the works were actively carried on, particularly when the wind blew in the direction of the house, there were produced numerous cases of fever, of an intractable and typhoid form; a typhoid tendency to measles, small-pox, and other infantile diseases, and for some time a most un-

manageable and fatal form of apthæ of the mouth, ending in gangrene. From this cause alone 12 deaths took place among the infants in one quarter. In the month of December, 1848, when cholera had already occurred in the Whitechapel Union, 60 of the children in the workhouse were suddenly seized with violent diarrhœa in the early morning. The proprietor was compelled to close his establishment, and the children returned to their ordinary health. Five months afterwards the works were recommenced; in a day or two subsequently, the wind blowing from the manufactory, a most powerful stench pervaded the workhouse. In the night following 45 of the boys, whose dormitories directly faced the manufactory, were again suddenly seized with severe diarrhœa; whilst the girls, whose dormitories were in a more distant part, and faced in another direction, escaped. The manufactory having been again suppressed, there has been no return of diarrhœa up to the present time.

In the summer of 1847, a similar manufactory was established in the parish of St. George, Southwark, in the midst of a dense population. It is stated that, on the very first occasion when the operations of this manufactory were commenced, a most powerful stench pervaded the neighbourhood, so as to attract general notice, and that soon afterwards a large number of persons living around were suddenly seized with diarrhœa. A medical man in extensive practice in the neighbourhood states that, he had immediately great numbers of applications for medicine to check diarrhœa. Being convinced that this local illness arose from the poisonous animal effluvia that proceeded from this manufactory, the necessary steps were taken by the local authorities; the nuisance was suppressed, and the diarrhœa directly subsided.

“In reference to these two cases,” (says Mr. Grainger,) “it is not superfluous to remark, that, in both, the parties offending were foreigners; a class of persons, it appears from information I have received, who are somewhat extensively engaged in the manufacture in question, and who are attracted to London by the existence of facilities so properly denied them by the laws of their own country.”

Dr. Baly, Physician of the Millbank Penitentiary, after careful investigation, is of opinion that the diarrhoea and dysentery to which that prison is so subject, are intimately connected with the noxious animal effluvia wafted across the Thames from the bone-boiling establishments in Lambeth.

One of the most severe outbreaks of cholera that occurred in the metropolis was at Albion-terrace, Wandsworth-road, a place consisting of 17 houses, having the appearance of commodious, comfortable dwellings. About 200 yards in the rear of the terrace, is an open black ditch, which receives the drainage from Clapham, Streatham, and Brixton-hill. The inhabitants of the houses complained of offensive effluvia in their gardens behind; whenever the wind blew in a particular direction; the servants complained of a stench in different parts of the kitchen-floor, more especially over the sink in the back-kitchen. In the house in which the first case of cholera occurred, there was an enormous accumulation of most offensive rubbish, amounting to seven or eight cartloads, consisting of a disgusting compound, swarming with maggots, and exhaling a putrid effluvia. There is also reason to believe that the water supplied to some of the houses, accidentally became contaminated with the contents of a sewer and cesspool. Within the space of a fortnight, out of an estimated population of 120 persons residing in this terrace, 42 persons were seized with cholera, of whom 30 died, or 71 per cent. of the whole number attacked.

In the "Potteries," at Kensington, a place already noticed, there were kept 3000 pigs; the process of fat-boiling was carried on so extensively as to taint the atmosphere for half-a-mile round; the dwellings, or rather hovels, in which the inhabitants lived, are stated to be unsurpassed as to filth and misery, by anything, known in Ireland; the streets, courts, alleys, and yards are without a drop of clear water, all being charged with organic matter, and on the margin of a large stagnant piece of water, called the "Ocean," which is covered with a filthy slime, and bubbling with a poisonous gas, caused by the drainage of pig-sties and privies that flow

into it, is placed St. James's National School, with about 130 children. It has been already stated that, in this place, out of a population of 1000 persons, there occurred within the first 10 months of 1849, fifty deaths; that is, at the rate of 6 per cent. per annum; and that of these, 29 were from fever and other causes, and 21 from cholera and diarrhœa.

The condition of this place is not only the cause of excessive mortality to its own inhabitants, but is the source of disease and death to those in its immediate neighbourhood. Some 1200 or 1300 feet off, reports Dr. Lewis—

“Is situated a row of clean, respectable houses, called Crafter-terrace, Latimer-road; the situation, though rather low, is clear and airy. On Saturday and Sunday, the 8th and 9th of September 1849, the inhabitants complained of an intolerable stench, the N.E. wind blowing directly upon the terrace from the Potteries. Till this time there had been no case of cholera among the inhabitants. The next day the disease broke out violently, and on the following day, the 11th, a child died at No. 1; on the 12th, a person died at No. 2; on the 13th, one died at No. 5, and another at No. 7; on the 14th, another child at No. 1; on the 15th, a second child at No. 5; and on the 22nd, an adult at No. 9.”

Mr. Ranger gives, as an example of the state of filth in which the poor are often doomed to live, the following result of an examination, made by himself, of some houses in the town of Cowes.

In the Marsh, he says,

“Houses are standing literally over cesspools. In one instance, that of a block of four houses, finding the inmates bearing a most unhealthy aspect, I was induced to examine the seat of the houses by having a hole made through the boarded floor; immediately under and up to within a few inches of the under side of the floor, the sub-stratum to a depth of more than 3 feet was that of a slime emitting a stench like that of a foul cesspool; this was the seat of cholera, and forms but one of the many cases where parties are residing in the vicinage of excrementitious and noxious effluvia.”

Four out of eight deaths from cholera that occurred in Hampstead, took place in one family living in rooms over a stable, there being at the door a dung-pit, and in the interior, in addition to the ordinary sources of im-

purity, two or three pits made to collect the urine of the animals; in a yard at the rear, into which one or two windows looked, there was a privy that stunk abominably, and within two or three yards of it a pigstye, scarcely less offensive.

The medical officers of Marylebone state, that persons suffered intensely who lived over stables and cowhouses, of which there are so many in the mews of that parish, and a similar result was observed in all the affected districts of the metropolis.

There is a spot in the town of Hull which affords a remarkable example of the influence of town refuse in lowering the standard of the public health, and predisposing to epidemic disease:—

“On the east side of the town of Hull,” (says Dr. Sutherland,) “there lies a suburb called Witham, in which there is a triangular space of ground bounded by the streets called Witham, Great Union-street, and Church-street. This triangle is surrounded by houses, so as to leave an open space in the centre of nearly three acres in extent, about two acres of which is used as a place of deposit for part of the night-soil of the town and other manure, which is interspersed in heaps among the houses, and close to the doors of dwellings. These noxious matters are collected by a number of persons who make a trade of accumulating and selling them for agricultural purposes, and they have become so accustomed to live amongst this horrible garbage, that they not only heap it up against the walls and immediately under the windows of their houses, but it is stated that they have come to consider the atmosphere of the locality ‘rather wholesome and agreeable than otherwise.’ One indication of the extreme unhealthiness of this district is afforded by the fact, that although the average age of all persons who die in other parishes in the town of Hull is 23 years, the average age of all persons dying at Witham is only 18 years.”

A warning was given of the approach of cholera on the town ten months before its arrival. Earnest representations were made to the local authorities as to the extreme danger of this particular spot, but these representations were made in vain; nothing was done to cleanse it. Cholera at length struck the town, and broke out in this spot with a violence scarcely paralleled in any other place in this country. On the outskirts of a triangular space, measuring little more than 200 yards,

there occurred 91 deaths from cholera. "I have never known," says Dr. Sutherland, "an open neighbourhood of this size yield so large a number of deaths."

A plan of this locality is given in plate 1, taken from Dr. Sutherland's Report, Appendix A., in which the sites of the deaths from cholera, in relation to the filth which caused them, are very clearly shown.

Among the places most severely visited by cholera during the late epidemic, and in which the disease held on its destructive course for the longest period, were Merthyr Tidfil, Dowlais, and Pen-y-darran, all in the same neighbourhood. Long antecedent neglect had accumulated perhaps in the most intense form anywhere witnessed in this country all the conditions necessary to localize the disease. Mr. Bowie, who was at Merthyr during a considerable portion of the epidemic, gives the following account of the condition of the affected districts.

"The vast masses of refuse; the enormous collections of everything vile; the crowded state of the houses, many of them dilapidated and ruinous, and some standing on a disused burial-ground, with portions of the tombstones before their doors; the want of ventilation; the scarcity of water, for a scanty supply of which many of the people have to go more than a mile, and to wait perhaps a whole night:—more miserable and deplorable places particularly than Pen-y-darran cannot exist, nor any better calculated to manufacture fever and pestilence on a large scale."

This description proves that there are causes of disease in operation in such localities against which no merely temporary measures of relief could be of much avail, and the melancholy consequences in the examples mentioned must be within the memory of all.

The reports of the inspectors and medical officers abound with representations of the extraordinary prevalence of cholera among the inhabitants of houses having foul and overflowing privies, and the following statement, derived from foreign experience, affords a striking illustration of the fatal effects produced by exposure to these emanations:—

"At a late meeting of the Institute was read a highly interesting memoir on the epidemic attack of cholera in the prison

at Brest, occupied by the galley slaves. Some facts, which seem clearly to connect the development of the disease with malarious causes, may be worthy of record. The prison contained 2,662 inmates, distributed in four wards and in an infirmary. The four wards are furnished each with 27 water-closets, in order that the prisoners of each row may be enabled to reach the closet without being unchained, for these unhappy culprits never quit their heavy chains for an instant. The water-closets communicate with a drain which opens into the harbour of Brest, and at low water the south-west winds, blowing up the unguarded drain, force back the mephitic vapours into the very wards. The infirmary and the condemned cell are free from this inconvenience. 189 cases of cholera occurred in the prison, and of these no less than 113 proved fatal. Now, of 2,445 prisoners in the wards just alluded to, 165 were attacked by cholera; while of 217 individuals in the infirmary and condemned cell, only three persons were attacked. The very same result had occurred in 1832. At that period 53 prisoners were cut off by cholera in the wards furnished with water-closets connected with the open drains, while in the infirmary, which is free from this source of disease, only a single death took place.

We believe that the experience has been everywhere very similar in England, and we have met with no instance of any series of cases of cholera in prisons in England where there was not some such cause present to account for the attack as that displayed in the above instance.

MALARIA FROM PUTRESCENT MUD.—While epidemic cholera was prevailing in the town of Cardiff, in the month of June, 1849, a sudden attack of the disease took place in a cluster of houses about a mile and a-half distant from the town, situated near a canal, from which the water had been drawn off, leaving a large surface of black putrescent mud to the direct action of a hot sun, and the result was that very offensive effluvia were immediately perceptible. The smell was complained of by the inhabitants of all the adjoining houses, and produced a variety of symptoms, varying in intensity in different individuals. There were on this spot 22 houses, three of which were vacant, and the total population was 117 souls. Out of the 19 inhabited houses 15 were affected, so that only four escaped. There were in all 43 cases of diarrhœa, 33 of developed

cholera, and 13 deaths ; so that nearly one-third of the inhabitants were attacked with cholera, and one-ninth of the whole perished. The works of the canal were finished as expeditiously as possible and the water admitted. Persons on the spot stated that the air felt purer immediately, and the disease was arrested.

Dr. Milroy has called attention to the effect of foul canals and ditches in the neighbourhood of London in predisposing to severe attacks of cholera.

“ I have reason to believe,” (he says,) “ that the severity of the disease in some localities in the metropolis was attributable to their proximity to canals and basins in which the water was nearly stagnant, except when it was stirred by the passing of barges. One of the most striking instances of this source of insalubrity which has come under my notice was what occurred in the neighbourhood of the Cumberland Basin of the Regent’s Canal, situated about midway between the Hampstead-road and the Regent’s-park. During the prevalence of the epidemic there was a great amount of cholera in all the adjoining streets, a much greater than might have been expected, when we consider that the locality is generally regarded as salubrious, being open, rather elevated, and by no means densely peopled. The street which suffered most severely is Edward-street, on the west side of the basin. Only one side of the street is entirely occupied with houses, the other being but partially so. In some of these houses as many as four, and even six fatal cases occurred, besides a very general prevalence of diarrhœa among the residents. Mr. Johnson, the parochial surgeon of this district of St. Pancras, informed me that within a space of 200 feet in length 20 fatal cases of cholera occurred. Augustus-street, on the other or east side of the basin, also suffered, although much less severely ; and two, if not more fatal cases occurred on the north side of Cumberland Market, the rears of the houses there being open to the canal. I find, also, that there was a great deal of choleraic disease among the men who were employed in the barges, and that most of the families living in the houses on the wharves were more or less affected, in some cases with great severity, and in one instance fatally. One woman informed me that she and her family were ailing chiefly from bowel complaints during nearly the whole season. Her house is clean and well drained, and the only reason she could imagine for the constantly-recurring illness of herself and children was the unpleasant smell from the canal. From all accounts it appears that the water was in a most offensive state, and, indeed, no better than that of a stagnant putrid ditch. Its surface was entirely covered with duck-weed, so that it

looked more like a meadow than the basin of a canal, and when anything was thrown into it streams of foetid gas came bubbling up. Mr. Johnson assured me that he has known the men obliged to leave their barges in consequence of the foul smell when the water was disturbed. So putrid had it become that not a fish was to be seen in the basin, although it formerly teemed with them. When drawn, it was observed to contain myriads of insects and animalculæ, and the men were unwilling to use it even for boiling potatoes, especially as it was dark coloured and also offensive in smell at the same time. I have conversed with several medical gentlemen in the neighbourhood and find that they had long regarded the state of the canal as injurious to the health of the residents near it; moreover, they all agreed in believing that the effluvia from it tended very much to increase and aggravate the epidemic of last season. So strongly convinced was Mr. Johnson of this that he made a forcible representation to the parochial authorities of St. Pancras on the subject, and with the good effect of having the Directors of the Canal Company summoned before a magistrate, for the purpose of compelling them to have the basin cleaned out. This was agreed to be done; but it was judiciously postponed until the epidemic had ceased and the weather had become cool. The quantity of mud removed was enormous, amounting to between two and three thousand tons, and, there is reason to believe, that nearly as much was left behind, in consequence of the inefficient manner in which the process was conducted. It was black and foetid, like that from an obstructed sewer. No one will wonder at this when he learns that the basin had not been cleaned out for 25 or 30 years, and that the water had never been renewed during the whole of that period, while every year it was becoming more and more offensive, from the pollutions that were thrown into it. All the people engaged on the basin admit that a great improvement has been effected by what has been done; they are now no longer annoyed with any disgusting smell from it, although the re-appearance of duckweed on its surface pretty nearly shows how stagnant the water must be. Swarms of small fish have returned to it.

“I find that complaints have been made of the exhalations from the canal at a considerable distance, from the basin near Cumberland market; but without detailing any particulars at present, I shall merely mention that a good many severe cases of cholera occurred last year in James-street and Grove-street, Camden Town; and that, in Mr. Johnson’s opinion, the effluvia from two or three small docks, where the water of the canal is usually stagnant and more or less offensive, and which are in the immediate vicinity of the streets in question, were

not without a most pernicious effect upon the health of the residents.

“The exhalations from the muddy banks or bottoms of ditches and canals were observed, in many parts of the country, to promote the development of cholera. I saw a striking instance of this at Oxford. In a house recently built, clean, and standing by itself, six persons were attacked, and four died of the disease. There did not appear to be any cause of insalubrity within the house; but it stood upon the very edge of a lengthened ditch or canal, which communicated with the river, but was generally left nearly dry during the summer months, and then exhaled an unpleasant smell. It is quite a spot where we should expect to meet with agueish disease.

DAMPNESS.—The late epidemic has afforded large additional evidence in proof of the statements already made as to the influence of dampness in causing the localization of the disease. It has been already stated that the districts bounding both sides of the Thames have suffered much more than those at a distance from the river; upwards of 64 per cent. of the total deaths of the metropolis having occurred in its neighbourhood. One main cause of the excessive mortality near the banks of the Thames appears to be the large evaporating surface of foul water which such sites present.

“At Hamburg,” (says Mr. Grainger,) “in those streets which immediately face the spot where the numerous canals that have traversed the city and have become loaded with the excreta of 175,000 people, concentrate to pour their foul contents into the Elbe, the cholera raged so violently as to destroy 3·01 per cent of the inhabitants, while residents near the other and purer parts of the river suffered much less. The street in Berlin distinguished above all others for its excessive mortality occupies on the map of that city precisely the same spot as the above locality at Hamburgh, being, in fact, placed just where the numerous branches of the Spree, which go off from the river at its entrance into the city, again re-enter it, like a huge Fleet-ditch, after being loaded, as was pointed out to me, with all the filth from the drains and débris of the houses. In the small town of Chesham, where a severe outbreak of cholera took place in 1848, I found that the focus of the disease was a place called Water-side, situated below the town and close to the little river Chess, which, entering the place as a sparkling stream, becomes subsequently poisoned by the putrid matters from tanner’ yards, slaughter-houses, and cesspools.”

Dr. Sutherland points out the mischievous effects of a wet sub-soil, under circumstances which have not attracted that degree of attention which their importance deserves.

“At first sight,” (he says,) “it might appear that houses built on hill-sides, at a considerable elevation above the neighbouring low ground, ought to be exempt from the attacks of epidemic disease. Their airy exposed situation, and great apparent facilities for drainage, might be supposed to render them specially conducive to health, but such is by no means a necessary consequence of the simple accident of elevated position. It has been considered a mark of the peculiar capricious and erratic nature of cholera, that it has sometimes attacked lofty situations, while it has left the neighbouring valleys untouched. During the late epidemic several examples occurred of extremely violent outbreaks in towns, and even in individual houses built on the sloping sides of hills. I might instance the cases of Hamilton in Lanarkshire, Maxwelltown in Dumfriesshire, and Dowlais in South Wales, with a number of other places similarly situated.

“The reason of this predisposition will be easily understood by an individual illustration. The one I shall select is that of the village of Spring Bank, which may be considered as the epidemic centre of Glasgow. This case is especially illustrative, because there is a head of water in the Forth and Clyde Canal, not many yards from, but considerably above the level of the foundations of the houses. The pressure of the water keeps the hill-side in a state of perpetual dampness, and the water collects in any hollows which may exist in the ground. The consequence is, that the atmosphere is moist both within and without the houses.

“In other instances a similar effect is produced by the lateral exudation of moisture from slopes of hills proceeding from the natural drainage, the usual rainfall in its passage from the surface of the hill to the low ground appearing at various points on the hill-side. It must be obvious that, if a row of houses be built across the natural course of the drainage, the foundations will obstruct the downward flow of the water, and accumulate it in the ground immediately behind the houses. In one such instance a stream of water actually percolated the back wall of a cottage from the slope above, and escaped upon the public road after passing through the house. This dwelling was attacked with cholera.

“The evils described are greatly aggravated if pigsties, manure-heaps, or other nuisances, are placed higher than the houses, especially if the ground be at all of a porous nature. In

such cases the lateral drainage becomes polluted with organic matters.

“ Even surface-drainage, flowing from the higher to the lower parts of towns, at times produces much mischief. Such an instance occurred when cholera was prevalent in Edinburgh. The disease carried off four or five individuals in a single house, fronting the open country, at the foot of one of the closes in the Canongate. There was not a single case of cholera in the neighbourhood except these, and the house was perfectly clean, and the locality well ventilated. The catastrophe arose as follows:—The drainage of the High-street and Canongate takes place on the surface, and is continually impregnated with night-soil and other impurities. In passing the mouth of the close in question, from some defect in the gutter, part of the drainage was turned aside and ran down the close. There was no escape for it at the lower end, where it accumulated and became extremely offensive. Only two or three families were exposed to the effluvia, and one of them was almost entirely destroyed. The cause was then recognised and removed. I cite these facts as affording individual illustrations of a class of causes which operate in rendering localities unhealthy which otherwise should not be so. Houses and towns built on hill-slopes evidently require sanitary precautions of a particular kind, and proper means should be taken to cut off the natural drainage from the site chosen, and to divert it in such a way as to render it innocuous.

“ Much of the evil resulting from the close proximity of rivers and canals arises from lateral infiltration of the subsoil, and not merely from the aqueous vapour which rises from the surface of the water itself. In the village of Spring Bank already referred to, many of the houses most severely attacked by cholera had their floors nearly on a level with the canal. A small cottage in which the first cases occurred is thus situated. It contained two inhabitants, both of whom died, and there was no other appreciable reason for the attack.

“ The epidemic seizure of the lower part of Inverness in April, 1849, affords another similar illustration. The site occupied by the houses is a flat gravelly piece of ground on the banks of the river Ness, and the foundations are rather below high-water mark. The whole of this gravelly subsoil receives the brackish water of the river, which can be obtained by digging a few feet below the surface.”

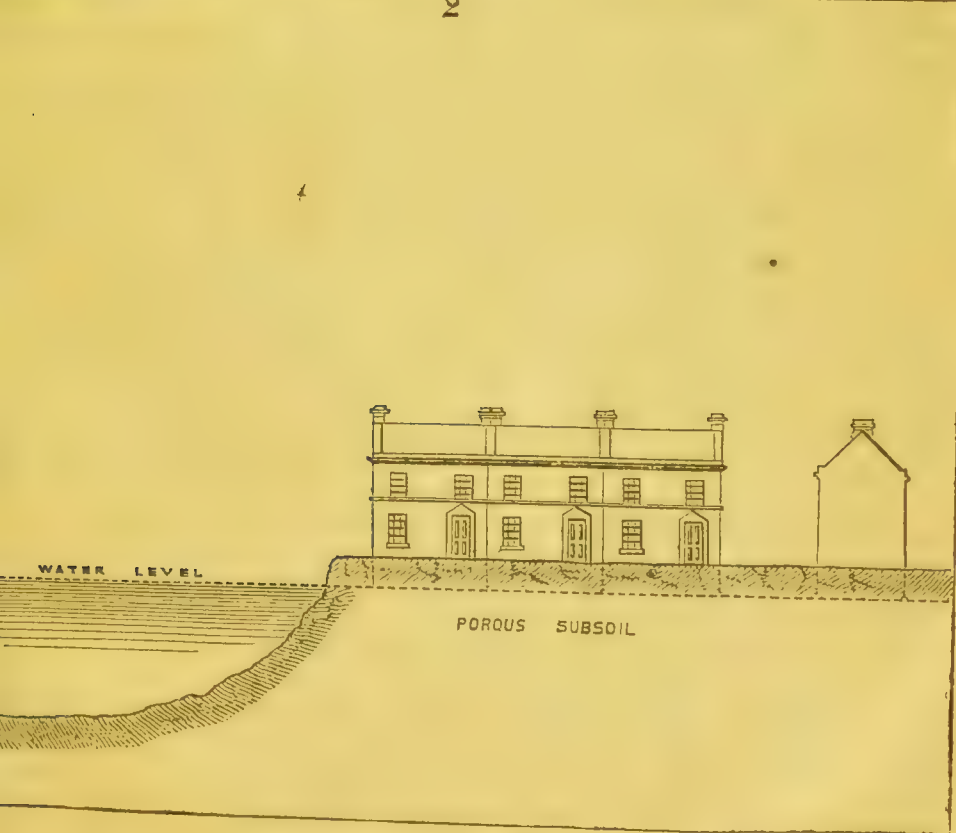
The accompanying sketches from Dr. Sutherland's report, illustrate the operation of these causes of dampness.

No. 1 shows a section of a row of houses built on a hill-slope, across the natural course of the drainage,

1



2



Origin of Damp Subsoil.

which is interrupted both by the cutting across of the strata, and by the obstruction which the houses offer to the surface-drainage.

No. 2 shows the lateral infiltration of water from rivers and canals under the foundations of houses built on their banks.

In further illustration of the localizing effect of dampness, Dr. Milroy states as follows:—

“Speedwell-street, in Oxford, was more severely visited with cholera than any other street in that city, and yet it is moderately wide, and the houses are newly built, of fair size, and well windowed, and the inhabitants are respectable and above the lower class. The cellars and basement stories, however, were very damp, and in wet weather the water often stood one or two feet in them for months at a time. When the water dried up, the inmates were annoyed with a most unpleasant smell in the lower part of their houses.”

Dr. Sutherland calls attention to the fact that the higher flats of the houses in the larger towns of Scotland are the most unhealthy, and assigns the cause of it.

“It is commonly believed,” (he says,) “that the chief causes of sickness are connected with the condition of the surface or sub-soil of a town; but in the Scotch cities it is found that a great deal of epidemic disease occurs at the top of the loftiest tenements, where a comparatively pure atmosphere surrounds the dwellings. The perishable nature of the structures in many of the English towns renders a complete reconstruction possible within comparatively short intervals of time, and a progressive improvement and amelioration can thus be effected. Such, however, is not the case in Edinburgh and Glasgow, very many of the houses of which have been inhabited for centuries, and to all appearances will last for centuries to come. Ancient mediæval structures, after having served as mansions during feudal times, have been divided and subdivided to suit the necessities of a new class of occupants, with little regard to the best methods of effecting the change, and with an utter forgetfulness of the comfort, health, and convenience of the tenants. Houses with eight or ten successive nests of families, piled one above the other, are by no means uncommon. Such tenements are hardly suitable for the purposes of modern civilization, and they can only be occupied without absolute danger to the health and morals of the inmates by a strict application of those resources which science has brought to bear on the social welfare of the people. The ‘lands,’ as they are called, have generally one common stair to give access to their teeming

population, a circumstance which must always render a thorough cleanliness of these approaches next to impossible. Many of the stairs and the passages which branch off from them are dark and noisome; and from the absence of all domestic conveniences in the houses, they become depositories of filth of the most disgusting kind. The atmosphere in them is most impure, and often extremely offensive; and as the houses must be supplied with air through these channels, we need not be surprised to find that the supply is at times almost intolerable. The same want of convenience leads to a most abominable state of the closes, which all police regulations have hitherto failed to improve materially, especially in Edinburgh, so that the ordinary channels through which the atmosphere reaches the inmates, even in the loftiest and apparently best ventilated parts of the old town of Edinburgh, are impregnated with impurities, dissolved and carried along by the air. There are no means provided by which the solid and fluid egesta of the households can be removed, except the laborious process of carrying down the whole weight which had previously been carried up. There are neither water-closets, sinks, nor dust-shoots, and the result of the want of these most needful conveniences is, that all the offensive refuse of the house must be retained within inhabited apartments, and in immediate proximity to the scanty water-supply. The atmosphere is rendered damp and foul by the exhalations, and the water unwholesome by absorbing them. It is true that the police send round carts for removing the refuse; but under the best possible arrangements of this kind, the house refuse must still be retained sufficiently long to be injurious, while the inmates not unfrequently find themselves inconvenienced by the operation of conveying it down from such an altitude at the precise moment fixed by the police for its removal. The practical result is, that it is often retained as long as possible, or thrown out of the windows into the closes below. It is even not a rare occurrence to find large accumulations of decomposing matter, which appear to have lain for years, in garrets and empty apartments of these lofty houses."

WANT OF DRAINS AND BAD DRAINS.—The object of efficient drainage-work is two-fold; first, the removal of decomposing matter in suspension in water; and secondly, the removal of surplus moisture. But ample experience has proved that bad drainage, empirically conducted, in the hands of those who have given no special attention to the subject, increases the evil intended to be obviated, by extending the noxious evaporating surface, or by shifting the decomposing matter from one place to another. The

Superintending Inspectors in their reports on the various towns, they have examined, concur in stating that the force of fever and of cholera in general falls on those localities which are without drainage, or in which the drainage that has been attempted has been so unskilfully performed as to have increased the evil. Dr. Sutherland and Mr. Clark give a remarkable example of this in their Reports on Bristol. Dr. Sutherland in describing the condition of certain courts covering a piece of land 56 yards in length by 37 yards in breadth, and containing 66 dwellings, in which there occurred 44 deaths from cholera, says :—

“ A more deplorable event perhaps never occurred than these tables describe. A very slight consideration of the whole circumstances is, in my opinion sufficient to prove that this great sacrifice of human life was occasioned by ignorance or negligence, as flagrant as any which from time to time gives rise to railway or other accidents. A glance at the plan will show that something like sanitary improvements had actually been contemplated ; and no doubt it was believed that the object would be attained if only a sufficient number of drains and privies were constructed. Like every other step taken in a false direction, the so-called improvements increased the evil they were intended to mitigate, and, with the other circumstances above detailed, caused the untimely death of many innocent persons.”

Mr. Clark, speaking of the same localities, says :—

“ It would be incorrect to say that there were no drains (so called) in these courts, and it would be equally at variance with truth to say that they answered any purpose of drains in carrying off the refuse matter from the houses ; at the inner and farther extremity of the courts they were closed, and the fall, instead of being towards the other extremity, opening into the main sewer in Redcross-street, was found, on the contrary, to favour the flow of sewage upon the courts. The effect of this faulty construction was necessarily to occasion a large accumulation of privy and house refuse, amounting to several loads ; in fact, to create extended local cesspools of the worst and most obnoxious character.

“ Under these circumstances, it cannot be matter of surprise that cholera raged in these courts with terrific virulence—that, within a few days, 44 persons fell victims—and that it was not till the most energetic measures were adopted, and a complete purification and white-liming effected, that its ravages

were stayed. Of these 44 deaths, 20 occurred in Gloucester-court, 14 in Wellington-buildings, and 10 in Wellington-court; and to this fatal catalogue must be added yet another death, that of the man, viz., employed in cleaning out the drains, who, it was stated, died from the effects of the noxious effluvia to which he was thus exposed.

“The sequel is scarcely less striking and instructive. While these sheets were passing through the press, this locality was visited by two gentlemen, members of the ‘Health of Towns’ Committee’ of the Town Council (whose names have appeared more than once in this Report), who found, upon inquiry, that though the pavements, at the suggestion of Mr. Goldney, the medical officer, had been newly laid down, and fresh drains constructed, with a proper fall, some of the privies were again becoming choked, and all complained of as very offensive; that there was ‘not a drop of water’ upon the premises fit to drink; *that* supplied by the only pump being wholly unsuitable, from its tainted nature, for domestic purposes; and that scavenging, which should be performed once a week, was by no means regularly attended to. In fact, that these courts, notwithstanding the fearful warning so recently conveyed, were fast relapsing into the same neglected condition in which they were at the time of the cholera—striking evidence, this, of the indispensable necessity for *constant and efficient* sanitary supervision.”

Dr. Milroy gives the following examples of the effect of the contents of foul sewers in predisposing to violent attacks of cholera:—

“It is a fact which appears to me to be particularly worthy of notice, that the only clean and open street in Plymouth in which any fatal case of cholera has occurred this season is Union-street. Three fatal cases have occurred in two adjoining houses on one side of this street, and they were among the earliest which took place in the town. The circumstances are curious. In consequence of the construction of some works connected with the railway terminus the drains of these two houses had become dammed across, and the result was that their lower premises were overflowed with sewage water. Although measures were immediately taken to remove the nuisance, three of the inmates were attacked with all the symptoms of the malignant disease, which, at the time, had manifested itself only in one or two of the filthiest parts of the town, and were rapidly carried off. Several of the other inmates were affected with diarrhœa. One of the fatal seizures occurred in a young man who went down into one of the houses to get a bottle full of the foul water which had inundated the basement story. Within an hour he was attacked and he died in the course of 13 hours from the commence-

ment of the symptoms. He said himself that he felt certain that the stirring up of that filthy stuff was the cause of his illness.

“No subsequent sickness occurred in either of the houses after the nuisance was thoroughly corrected, nor in the immediate neighbourhood, although the epidemic has become much more widely diffused over the town than it was when the above cases occurred. The disease as quickly subsided in the locality as it had suddenly appeared.

“The pernicious influence of sewage water in localising the disease was manifested about the same time at Devonport. The street there that was by far the most severely visited in the early period of the epidemic, is William-street, in Morice Town. Its situation is low, but it is wide, and the houses are tolerably open behind. They are chiefly occupied by workmen engaged in the government dock, and by other labourers. At a short distance from the lower end of the street is the outlet of the main sewer of the district, at about three or four hundred yards from the sea, into which the foetid contents were conducted by a partially-covered trench. In the course of the summer this trench had become obstructed by the works of the new dock that is in process of building, and the sewage in consequence overflowed a large open space situated between its outlet and the sea, and converted it into a stinking quagmire, from which the most disgusting effluvia were continually given off. It is worthy of notice, that the first fatal case of cholera occurred in the corner house in William-street, which was nearest this disgusting nuisance. The general impression was that the pollution of the atmosphere from the nuisance now mentioned was one of the principal causes of the large amount of sickness in the neighbourhood.”

Dr. Milroy further states, on the authority of Dr. Allen, the resident physician of Marylebone Infirmary, that close to a ward in that institution where cholera first appeared, while the rest of the house was exempt from the disease, there had been an open untrapped drain which emitted very offensive effluvia. The nurses remarked that the smell was always worst when the windows were first opened in the morning. The nuisance was immediately corrected, and thereupon the disease ceased to manifest itself in this particular part of the building.

GRAVEYARDS.—After the evidence which we have elsewhere adduced of the injurious effects of graveyards, on the crowded populations in their immediate neighbour-

hood, we shall only cite the two following occurrences, in further illustration of the fact derived from recent experience.

At Bristol, at a place called the Rackhay, there is a burial ground about 80 feet in length, and between 40 and 50 in breadth, the surface of the earth of which is four and a-half feet above the level of the pavement in the adjoining courts. It is completely surrounded by houses, 33 in number. Under the external walls of the burial ground there are drains with open gully grates, from which, at the time the medical inspector examined them, issued a most offensive odour, having the unmistakeable graveyard smell. Out of those 33 houses, one of them being empty, cholera broke out in 15, chiefly in those on the side next the burial ground. In one house there occurred no fewer than 11 cases, and in several from five to six, in all 47 cases and 33 deaths.

“There were no local sanitary defects,” (says Dr. Sutherland,) “which tended to make this place more liable to an epidemic outbreak than other districts in the same neighbourhood, except the presence of the burial-ground, and the polluted state of the drainage, to which it appears to have materially contributed.”

“It is known,” (says Mr. Grainger,) “that a most distinguished surgeon, Mr. Key, whose valuable life fell a sacrifice to the late epidemic, resided in a house the back windows of which looked directly into a graveyard; that he was much in the habit of sitting at these windows when opened; that he had complained to his servant several times shortly before his attack of the offensive smell proceeding from the burial-ground, in which some cholera corpses had been interred; and that on the very day of the fatal seizure a grave had been dug which attracted his attention as having increased the noxious effluvia.”

UNWHOLESOME WATER.—During the late epidemic much additional evidence has been elicited proving the influence of the use of impure water in predisposing to the disease. There has been scarcely a town in the kingdom in which cholera has been prevalent that has not afforded some instance of it; and when the water has been contaminated by the contents of sewers or privies, or by the drainage of graveyards, the seizures have been more sudden and violent, and the proportion of deaths to attacks greater even than from overcrowding.

The following out of great numbers may be cited as examples.

The privies of a number of houses in Silkmill-row, Hackney, were pulled down, and cesspools substituted. In Dr. Gavin's Report it is stated—

“The first cesspool was sunk in the middle of July within one yard of the only well which supplies with water 12 houses containing 85 inhabitants. Three other cesspools were made at the distances of 3, 5, and 12 yards from this well. About a fortnight or three weeks after the first cesspool had been made, the inhabitants observed the water become tainted and offensive; it gradually became worse until, when I saw it, that fresh drawn in the morning was as thick as thin soup, with feculent matter. The landlord's agent employed himself an hour every morning in pumping off the thickened water in order to fit it for consumption and use. After his morning's work he declared the water to be quite good enough for the inhabitants. Those who do not choose to drink and cook with this most foul water are compelled to catch the surface water which flows along the kennel from the road and neighbouring field. This water, which at other times would be considered foul, appears pure when compared with that used by the unfortunate inhabitants of this place.”

Of these 85 inhabitants, 22 did not use the water of the well: these remained free from disease. Of the remaining 63, 46 were attacked with severe diarrhœa, one of them approaching cholera.

Five houses in Windmill-square, Shoreditch, occupied by 22 inhabitants, were supplied with water from a well into which surface refuse and the contents of cesspools percolated. Of the inhabitants of these houses 11, that is, one-half of the whole number, died of cholera within a few days.

The first outbreak of cholera in Rotherhithe occurred in 16 houses which were supplied with water from a well that was expressly ascertained to be contaminated by infiltration from a foul open ditch. In these 16 houses there were 20 cases of cholera; and several of the persons who died were decent mechanics, and not in destitute circumstances.

The water which supplied 25 houses in another street was taken out of a ditch that received the contents of privies. In these 25 houses there occurred 15 deaths

from cholera. The medical officer states his conviction that the use of this water acted powerfully as a predisposing cause, and tended to the spread of the disease. The rector, who was the chairman of the Board of Guardians, says:—

“He was constantly occupied in aiding with the guardians in the preventive measures during the height of the epidemic; observed in some cases where the disease had been very severe, and where the water was tainted, that, on supplying pure water and having a medical man in constant attendance, the cholera was controlled to a marvellous extent, few cases occurring subsequently. Is convinced from the facts that came to his knowledge that the bad quality of the water in certain localities acted most prejudicially as a predisposing cause, and led to the spread of the disease.”

Thirteen small houses, forming a court called Surrey Buildings, in Horselydown, were supplied with water from a sunk tank, the edge of which was even with the pavement, so that it constantly received the washings of the court. Here 8 deaths from cholera occurred in one week, and another followed in the ensuing week.

In Waterloo-road, Lambeth, where the mortality from cholera was excessive, the water supplied by the Lambeth Water Works is stated to be “muddy, having a foetid smell and replete with insects.” In some of the courts 70 or 80 persons are dependent on one tap, and “a very active scramble occurs to secure the precious fluid.” At a place called the Apollo, with 51 houses, the water flows only for about 30 minutes daily. Here 12 fatal cholera cases occurred. In the same locality, within a very limited space, exposed however to other localizing circumstances, besides the deficient and bad supply of water, it is stated that great numbers experienced very severe attacks of cholera; 42 died, and it is believed there was scarcely a house in which the inmates did not suffer from diarrhœa.

In one court in Lambeth, where most malignant scarlet fever, with sloughing of the integument, and very bad typhus fever had prevailed, two severe cases of cholera having occurred, the surgeon was induced to examine the water supplied by a pump, when he found it discoloured, and so foul that “it stank at a distance of

the contents of a cesspool;" the piston of the pump was removed, and no other case of cholera occurred in the court.

In Manchester a sudden and violent outbreak of cholera took place in Hope-street, Salford. The inhabitants used water from a particular pump-well. This well had been repaired, and a sewer which passes within nine inches of the edge of it became accidentally stopped up, and leaked into the well. The inhabitants of 30 houses used the water from this well: among them there occurred 19 cases of diarrhœa, 26 cases of cholera, and 25 deaths. The inhabitants of 60 houses in the same immediate neighbourhood used other water; among these there occurred 11 cases of diarrhœa, but not a single case of cholera, nor one death. It is remarkable that in this instance, out of the 26 persons attacked with cholera, the whole perished excepting one.

Observations of the analogous influence of polluted water in producing fever have been made in other countries. Dr. Boudin, a French writer on Medical Geography, relates a marked example of marsh-water exciting fever:—

"In July 1834, 800 soldiers, all in good health, embarked on the same day in three transports at Bona, and arrived together at Marseilles; they were exposed to the same atmospheric influences, and were, with one essential difference, supplied with the same food and subjected to the same discipline. On board one of the vessels were 120 soldiers; of these 13 died on the passage from a destructive fever, and 98 more were taken to the military hospital of the lazaretto at Marseilles, presenting all the pathological characters proper to marshy localities; so that 'by the side of a simple intermittent was seen a pernicious fever. Here was a type recalling the yellow fever of the Antilles, and there was the cholera of the Ganges, with its most terrible traits.' On an inquiry being instituted, it was ascertained that on board the affected ship the water supplied for the soldiers, owing to the haste of the embarkation, had been taken from a marshy place near Bona, whilst the crew, not one of whom was attacked, were provided with wholesome water. It further appeared that the nine soldiers who escaped had purchased water of the crew, and had consequently not drunk the marshy water. Not a single soldier or sailor of the other two transports, who were supplied with pure water, suffered."

Dr. Evans, of Bedford, relates an equally definite instance:—

“A few years ago he was staying at Versailles with his lady, when they both became affected with ague, and, on inquiry, the following facts were disclosed:—The town of Versailles is supplied with water for domestic purposes from the Seine at Marli. At the time in question a large tank, supplying one particular quarter, was damaged, and the mayor, without consulting the medical authorities, provided a supply of water consisting of the surface-drainage of the surrounding country, which is of a marshy character. The regular inhabitants would not use this polluted water; but Dr. and Mrs. Evans, who were at an hotel, drank of it unwittingly, and it was also used by a regiment of cavalry. The result was, that those who drank the water suffered from intermittent fever of so severe a type that seven or eight of the soldiers, fine young men, died on one day, September 1, 1845. On a careful investigation it was ascertained that those only of the troops who had drunk the marsh-water, were attacked, all the others, though breathing the same atmosphere, having escaped, as did also the townspeople.”

FOOD.—We recommended in our first notification the observance, during the prevalence of the epidemic, of such a solid and dry diet as would naturally tend to maintain a moderately constipated state of the bowels; and with this view an abstinence, or at least a very limited indulgence, in vegetables and fruits. We also gave a caution against the use of salted or dried provisions, and the oily kinds of fish, as well as shellfish. We likewise enjoined moderation in the use even of the most wholesome and suitable food, and, as a rule, an abstinence from ardent spirits. The experience of the late epidemic has shown that these precautions were of more importance than could have been fully comprehended at the time. Such disastrous consequences had resulted in some foreign cities from the use of crude vegetables and acid fruits, that the authorities forbade the sale of them, and articles of food of this description have been found equally pernicious in our own country. Among the first cases of cholera that occurred in Great Britain were those of the Prussian sailors on board the barque “Pallas,” who having been brought from a healthy town were exposed for a few hours to the epi-

demic influence at Hamburg, and who ate on their passage to Hull a quantity of plums, which the vessel was bringing to Hull for the market.

“The eating of a few plums,” (observes Dr. Sutherland,) “would certainly, under ordinary circumstances, have produced no such fatal results; but during an epidemic constitution such indulgence is well known to be fraught with extreme danger. Possibly these men might have resisted their morbid state had it not been for the very serious error as to diet which they committed.”

“Instances were very common,” (says Mr. Grainger,) “where the seizure resulted merely from partaking of a hearty meal of substances liable at such a time to disturb the alimentary canal, such as veal, pork, eels, &c. It is particularly necessary to point out that during the epidemic influence even substances, which in ordinary times are harmless, may produce the most serious consequences. Thus, in one instance, the children of a physician, having been allowed to partake of cherries, were all seized with alarming diarrhœa.”

On examining the returns of the medical visitors and inspectors, such statements as the following are very common:—

“Had been under treatment two or three days for simple diarrhœa, and was convalescent when she indulged in eating plum pudding for supper, and was seized in the night with rice-water purging and vomiting, and was soon in a state of collapse. Died in about 20 hours.

“Seized during the night, after eating a hearty supper of greens and pork.

“Was pretty well after a slight attack of diarrhœa; had been warned to continue careful as to diet; ate heartily of stewed eels; in a few hours diarrhœa returned, and passed rapidly into developed cholera.”

Similar statements are made respecting other articles of diet against which caution has been given, and which, as has been proved by general experience, cannot be used without imminent peril during exposure to an epidemic influence, however grateful, innocent, and even nutritive, they may be to the same individual in the absence of an epidemic constitution.

There is also too much evidence to show that numerous attacks of cholera were indirectly induced among the poorer classes by the use of bad meat, tainted fish, and other improper articles of food exposed for sale.

“Urgent representations,” (says Mr. Grainger,) “were made in different parts of the metropolis, both by the local authorities and medical officers, respecting the open sale of articles of food, especially fish, altogether unfit for human consumption; it was stated, further, that the existing state of the law did not secure the suppression of this practice, which, in poor neighbourhoods, was felt to be a great evil. Several marked examples were brought under my notice, where violent attacks of cholera were distinctly traceable to the use of putrid fish, bad pickled pork, decayed cheese, &c.

Not only were habitual drunkards the most easy and certain victims of cholera but even single acts of intemperance were followed by almost immediate diarrhœa. A vessel in the roadstead of Sunderland, early in October, 1848, having arrived from Hamburg, and having had one death on board shortly after leaving the port was put in quarantine.

“I went alongside of her,” (says Dr. Sutherland,) “in a small steam-boat, for the purpose of making the needful inquiries. I saw all the crew, who appeared to be in perfect health, and one middle-aged man was especially communicative, and afforded a good deal of information in regard to the vessel. I gave the people instructions how to act in case the disease should again appear, and especially cautioned them to avoid intoxication, which I assured them would lead to certain death. This was about 7 o’clock P. M., and, immediately after I left, the man referred to went down to the fore-castle, where he had secreted a bottle of brandy at Hamburg, and drank a large quantity. In an hour or two afterwards he was collapsed, and died the next morning at seven o’clock.”

“Abundant evidence,” (says Mr. Grainger,) “was afforded during the late epidemic that habitual drunkards were highly predisposed to cholera; and of them a large number perished. Occasional excesses also led to a vast number of attacks; thus, at Hamburgh, it was observed that there was among the numerous sailors in that great port a regular accession of cholera every Monday and Tuesday, owing to the men going ashore and getting drunk on the preceding Sunday. In London also, several medical men informed me they had noticed the same thing; excess either in drinking or eating, particularly if improper food was used, such as pork, cabbage, &c., being followed by attacks, which thus became more frequent on Sunday night and Monday.

In Edinburgh, in Glasgow, and in the neighbouring manufacturing towns in general, it was observed, that

periodic augmentations of the disease were coincident with the earlier days of the week, which could only be attributed to the intoxication which followed the weekly receipt of wages.

"I cannot but express regret," (says Dr. Sutherland,) "at the small amount of restraint which has hitherto been put on this abominable vice. The whole licensing system, and the way in which it is too frequently administered, are a public disgrace, and call urgently for reform. In every fresh outburst of cholera, persons of dissipated, intemperate habits have been the first to fall victims to the disease; and I feel assured that many lives were sacrificed which might have been saved, had the vice of drunkenness met with that discouragement on the part of authorities and the legislature which its detestable and brutalizing tendency, as well as its injurious effects on the public health, have so long demanded."

Many deaths occurred during the late epidemic, from disregarding the caution against fatigue. In numerous instances, nurses and medical men, and on some occasions, clergymen, zealously devoted to their arduous duties, lost their lives from continuing their labours too unremittingly.

"I have seen a great number of instances of this," (says Dr. Sutherland,) "amongst different classes of people. Persons engaged in iron-forges, and other equally laborious occupations, have suffered in large proportion. The length of time during which the exertion is continued appears to be a more important element than the actual present amount of work, and hence it has been thought necessary in a number of instances to place the men on what are called short shifts.

"From want of attention to this matter, casualties have occasionally taken place amongst nurses in hospitals; and this class of cases is sometimes ranked amongst the results of contagion by inexperienced observers. Medical men have also suffered from a similar cause. I am not aware that any individual died while acting under my own special instructions; and I attribute this favourable result to my having endeavoured to impress upon them the necessity of avoiding over-exertion, and of making immediate application for additional medical aid as soon as they found it necessary. I am sorry to say that I have known instances where a different course was pursued from inadvertence. I met with one case in which the medical officer of a district gave each of his two assistants 24 hours' work and 24 hours' rest alternately. His object was a good one, but the result was fatal to the young men, and in little more than a week both were dead."

In the outbreak at Kurrachee, the regiments that had recently been fatigued by long and harassing marches, suffered in a double or treble proportion to those that were stationary. And this is the general experience of India.

Many lives were lost during the late epidemic, by the use of purgative medicines, even of the mildest kind and those to which individuals were accustomed.

“I have known a number of instances,” (says Dr. Sutherland,) “in which individuals living in comparatively healthy situations have been suddenly destroyed by the use of purgative medicine, and that in very moderate quantity. Saline purgatives, which under ordinary circumstances may be used with advantage, are invested with poisonous properties in relation to the altered constitutional state produced by the epidemic influence. A similar fact has been observed in regard to almost every form of aperient. A case came under my own knowledge, in which an ordinary dose of rhubarb and magnesia with mint-water produced a rapid and fatal attack of cholera in a healthy young woman who had taken the medicine as an aperient.”

“One very painful case of this kind,” (says Mr. Grainger,) “was related to me: a lady gave to her four young children some aperient she was in the habit of administering; this was at night. Early the next morning the children were seized with violent purging and vomiting, and ultimately they all died.”

“I have known the most alarming and even fatal results produced by the administration of the mildest purgatives; and it is certain much mischief was produced by the notion, so common among non-professional persons, that all cases of looseness of the bowels are caused by some noxious matter which demands expulsion. Mr. George T. Jones, who treated, as a medical visitor, 1,000 cases of diarrhœa, says,—‘When a poor man is attacked with a flux of any kind, and especially diarrhœa, he invariably thinks that there is some peccant humour in his body which requires to be discharged, and forthwith sets about to expedite the removal of the offending matter. Hence a reason why during my visitorship I have met with so many cases of diarrhœa, aggravated by taking doses of Epsom salts, jalap, and other drugs.’ This common and dangerous error was dispelled by the house-visitation, so that when this was established, but unfortunately only at the end of the epidemic the people were better informed on this point, and were not so eager to take purgatives.”

We may add to the preceding statements, that a

medical association has recently been formed in the United States, consisting of representatives from nearly all parts of the Union, whose special object is the investigation of questions connected with the public health. In their first Report, published last year, they so entirely coincide with the views as to the general localizing causes of epidemic given in this Report, that they arrive at the following conclusions :—

“ The great source of infection is putrefaction.

“ So long as the cause exists so long will disease be generated.

“ By preventing putrefaction we are enabled to arrest infection.”

Having thus called attention to some of the principal conditions proved by the late experience to have favoured the outbreak of the disease in particular localities, and to have predisposed individuals to its attack, we now proceed to point out certain exemptions from its visitation, which appear to us to place the influence of those conditions in a still more definite and impressive point of view. The exemptions in question, relate to large groups of people who were living during the whole course of the epidemic in the localities in which the disease was raging, and who belong to the classes that were the chief sufferers. Among the most remarkable of these exemptions, were the various establishments provided in the metropolis for housing and lodging the poorer classes, founded for the express purpose of proving the influence of sanitary arrangement in preventing excessive sickness and improving the physical well-being of the inhabitants. The efficacy of such establishments for the accomplishment of this object, has been brought to a severe test by the late epidemic, and the following examples may suffice to show the manner in which they have come out of the trial.

In George-street, Bloomsbury, and Charles and King-streets, Drury-lane, there are establishments for lodging single men, in which though the sanitary arrangements are by no means perfect, yet the inmates are exempt to a considerable extent from the evils of bad drainage, accumulations of filth, overcrowding and personal uncleanness.

These houses contain 210 inmates ; among the whole of which, with one exception, there was no case of cholera ; the exception being that of an old man, 70 years of age, of intemperate habits who rarely tasted animal food. All the other inmates escaped. It is remarkable, however, that in George-street there were ten and in Charles-street two cases of diarrhœa, thus demonstrating, that the epidemic influence was upon them ; but that the improved sanitary conditions under which they were placed, enabled them to resist it. In the house in King-street there was no case either of cholera or diarrhœa.

In the Lower Pentonville-road, there is a group of buildings consisting of 24 houses, containing between 80 and 90 inhabitants. Here the sanitary conditions are upon the whole better than those of the establishments in Bloomsbury and Drury-lane ; and the inmates of these houses enjoyed a complete immunity both from cholera and diarrhœa.

In the Old Pancras-road, is situated a large structure, called “ Metropolitan Buildings,” which is let out as separate tenements to families. It contains upwards of 500 inmates, of whom about 350 are children. This building is well drained, it is kept clean, an abundant and constant supply of water is afforded to each tenement ; there is no privy or cesspool on the premises, but each tenement is provided with a water-closet and also with a dust-shaft for the immediate removal of refuse. Though the structural arrangements of this building admit of considerable improvements yet its sanitary condition is far superior to that commonly found in the dwellings of the poor. A corresponding improvement has taken place in the health of its inmates. Taking the full period of its occupancy, now upwards of 18 months, its total mortality as compared with the general mortality of the metropolis, has been diminished one-half ; and as compared with the mortality of the worst parts of the metropolis, it has been diminished two-thirds ; while its infant mortality, the most delicate test of the healthfulness of a place, has been at least five times less than that of some parts of the metropolis. From its remarkable

exemption from disease in general, and especially from the zymotic class of disease, notwithstanding that it contained so large a proportion of infants, a confident hope was entertained that it would escape any visitation from cholera; and that hope has been realized, for not a single case of cholera occurred among its inmates, and only seven cases of diarrhœa; although at a distance of not more than between 300 and 400 yards from the building, in a row of houses called Paradise-street, there were three deaths from cholera in one house; in an adjoining court the disease was very prevalent and mortal; the whole neighbourhood was afflicted severely with diarrhœa; and in this parish, though at some some distance from this particular spot, within a space of 200 feet in length 20 fatal cases of cholera occurred.

On board the American ship "Eagle" a sudden and violent outbreak of cholera took place precisely similar to an outbreak in a village or the localization of the disease in the district of a town. Here the sufferers were exclusively steerage passengers. They were overcrowded, and had no proper ventilation. There were in all 250 of these passengers, of whom a large proportion were attacked with diarrhœa; 21 with developed cholera, and 13 died. The cabin of this ship was large, commodious, clean, and well ventilated, and while the epidemic was raging in such close proximity to them, the passengers in this better conditioned part of the ship, enjoyed a complete exemption not only from cholera but even from diarrhœa.

Some of the metropolitan prisons were entirely exempt from attack, others suffered severely.

In the Model Prison, at Pentonville, in the structure and arrangement of which important sanitary improvements have been introduced, out of an average of 465 prisoners, there was no attack of cholera and very little diarrhœa.

Giltspur and Newgate prisons enjoyed the former a complete, and the latter all but a complete exemption from the disease, though situated in a district which suffered with extraordinary severity from the epidemic.

In the House of Correction, Cold Bath Fields, in the epidemic of 1832, when the number of prisoners was

1,148, there occurred 319 cases of premonitory diarrhœa, 207 of developed cholera, and 45 deaths. At that time the drainage of the prison was defective, the sewers, which were dry-built, without mortar, had in places fallen in, and were choked with soil; there were water-closets but the pans were made of iron instead of earthenware, and, owing to the defective structure of the drains, their contents were not carried off. Subsequently the whole sewerage of the prison was rebuilt, and, on a late examination of it, was found to be in good order. The ventilation has been improved, and a small open fire, placed in each of the day rooms, appears to have operated beneficially, by preventing cold and dampness. In the late epidemic, out of 1,100 prisoners there was not a single case of cholera, and only a few cases of diarrhœa, which, by prompt attention, were prevented from passing into the developed form of the disease.

Bridewell prison, in 1832, is described as having been in a most filthy state; the dirt on the walls being merely covered with lime wash, so that when a thorough purification took place the walls were found coated with filth to the depth of two inches: three prisoners were allowed to occupy a single cell: no attention was paid to personal cleanliness and there was a deficiency of medical superintendence. In the epidemic of that period 12 of the prisoners were attacked with cholera, and four died. Since that time the state of the prison has been changed; it is now kept clean; personal cleanliness also is enforced; only one inmate is allowed in a cell, and the prisoners are under strict medical superintendence. In the late epidemic, cholera raged on all sides of this prison, in houses closely contiguous, separated only by a narrow court; yet, out of 90 prisoners, no case of cholera occurred, and only one case of diarrhœa, though it is stated that fresh prisoners were daily brought in of the lowest class, and in the greatest state of filth.

Attention has already been directed to the violent outbreak of cholera in the workhouse of Taunton, in which only 68 cubic feet of space was allowed to each child. In the county gaol, situated in the same town, the space allowed to each prisoner ranges from 819 to

935 cubic feet; at the same time there passes through each cell a perfect system of ventilation, while a temperature is maintained that hardly varies three degrees in the 24 hours. Each prisoner has abundant means of personal cleanliness; he has a water-closet, wash-hand-basin, and unlimited water supply, and personal cleanliness is strictly enforced. The inmates of the gaol, though in confinement, being thus surrounded by the appliances of health, escaped without experiencing the slightest touch of the epidemic; while, of the 276 inmates of the workhouse no fewer than 60, or nearly 22 per cent. of the whole number died of cholera within one week, and nearly all the survivors suffered to a greater or less extent from cholera or diarrhœa.

In the metropolitan district there are two public lunatic asylums, Bethlem and Hanwell; Bethlem contains, on an average, 400 inmates. During the late epidemic no case of cholera occurred in this establishment, which enjoyed a similar exemption in 1832. Yet cholera prevailed extensively and severely within a hundred yards of the building. In connexion with this establishment Mr. Grainger states,—

“Some years ago a particular gallery attracted the attention of the authorities, in consequence of the inmates suffering from fever and diarrhœa. This was the more unexpected, because the gallery was one of the most favourably situated in the whole establishment; it was lofty, very airy, and not at all crowded, and the patients were of the healthiest class. Upon examination it was ascertained, that owing to some defect in the water-closet, a leakage of the soil had taken place beneath the floor. This was corrected; the sickness ceased, and this gallery has ever since continued as healthy as any part of the Institution.”

From the report of the resident medical officer of the asylum at Hanwell, it appears that no case of fever has occurred in that institution, containing 961 inmates, since his appointment, a period of four years, and that he has been unable to find any record of such an attack for a much longer time. There is unmistakeable evidence that during the late epidemic, this institution was not exempt from its influence, for 140 females were attacked with diarrhœa, 17 in one night, together with

one nurse, all in the same ward, the diarrhœa being attended by great exhaustion, but none of these cases passed into the developed form of the disease, and no case of cholera occurred.

Several facts are stated relative to the results of improved sanitary conditions in the great hospitals of the metropolis. In St. Bartholomew's Hospital, for example, 478 cases of cholera were admitted into some detached wards. The average number of ordinary patients is 500, and there are upwards of 100 female attendants: out of this large number of nurses not a single case of cholera occurred. It is stated that great attention is paid to the sanitary condition of the establishment, and that in the year preceding the late epidemic the sum of 2,000*l.* was expended in improving the drainage of the hospital, which is represented as being now in a very efficient state.

Similar exemptions are described as resulting from improvements recently introduced into St. Thomas's Hospital and Middlesex Hospital.

Dr. Sutherland, after giving an abstract of the localizing causes in the various cities and towns under his inspection, and pointing out the circumstances under which certain portions of them were exempted from cholera, sums up the result of his experience as follows:—

“In every district which it attacked, its ravages were most fatal where the sanitary conditions were the worst. It took a smaller number from amongst those who lived in healthier localities; and, as a general rule, it may be stated, that those parts of our cities and towns which careful observation would pronounce as likely to be the most healthy, escaped almost entirely. The epidemic was no respecter of classes, but was a great respecter of localities—rich and poor suffered alike or escaped alike, according as they lived in the observance or violation of the laws of their physical well-being.”

Even when the exemption was not complete, as in the preceding examples, numerous instances occurred in which marked benefit was experienced from even minor improvements. In Liverpool it is stated that the total mortality from the epidemic cholera of 1849 was about equal with that from the epidemic fever of 1847; and Dr. Duncan gives the following instances, among

others, of decided benefit derived from recent improvements:—

In 1847, Lacc-street, one of the most unhealthy streets in Liverpool, was undrained. In that year there occurred in the street 200 deaths from fever, and 250 more from other causes. In 1848 it was sewered. During the epidemic of the following year, (1849) the deaths from cholera were only 36.

In a certain number of registered lodging-houses, the history of which has been traced, there occurred annually, *before* registration, which involves supervision, prevention of overcrowding, and attention to cleanliness, 150 cases of fever. During the late epidemic there occurred in these houses only 98 cases of cholera; while the total cholera cases in the town were to the fever cases of the preceding years referred to as 2 to 1; so that cholera *after* registration was only in the proportion of one to three as compared with fever *before* registration.

In a certain district, at the period of the fever of 1847, the cellar population amounted to 12 per cent. of the entire population. At that time the fever carried off upwards of 500 of the inhabitants. During the late epidemic, the inhabitants of cellars in this district having been reduced to less than 2 per cent. of the population, the deaths from cholera were only 94, or, in the proportion, of less than 1 to 5 of the former mortality from fever.

Dr. J. M. Adams, of Glasgow, records a fact illustrative of the same result, though in a somewhat different way. From having observed that two large tenements in College-street were the constant nurseries of disease, particularly of typhus, he expected, on the breaking out of the epidemic, that they would suffer severely, and therefore kept a watch upon them, causing a house-to-house visitation to be made of the several flats once or twice daily. From first to last there occurred in one of these buildings two, but in the other 15 cases of choleraic disease, three of which, in the latter instance, proved fatal. Both buildings were inhabited by the same class of people; but the first tenement, a few months prior to the commencement of the epidemic, had passed into the hands of a factor, who had caused all its houses and lobbies to be whitewashed thoroughly several times, and by constant inspection enforced habits of cleanliness on the tenants. In the other tenement which suffered matters remained in their usual dirty condition.

Mr. Bowie, in his reports to us, gives among others the following instances of the rapid suppression of the pestilence from the adoption of sanitary measures.

“At Nordelph, Norfolk, after the adoption of efficient means of cleansing, cholera was immediately checked, and disappeared altogether in three days, not a single fresh case occurring after the sanitary measures described were carried into effect.

“At Noss, near Plymouth, and at Offchurch, Warwickshire, it was arrested with equal rapidity. At Offchurch, however, on a relaxation of the measures of cleansing it again recurred; but now, instead of 7 deaths out of 10 cases, there occurred only 2 out of 12. In three days after the resumption of these measures the disease entirely disappeared.

“The experience at East Rudham was the same.

“At Mileham, Norfolk, after the adoption of prompt sanitary measures, the disease was arrested in a few days, and never again broke out.

“In some of the towns and villages of South Wales, where the like measures were carried into effect, the disease was quickly checked, and might have been removed with little comparative loss of life had these measures been persevered in with proper spirit.

“In Scotland generally the same results were obtained, and in one village cholera disappeared from the day that thorough cleansing was effected, and never returned.”

Mr. Grainger calls attention to an instance that occurred in the metropolis, showing the beneficial results that followed the removal of a special source of filth:—

“Camden-place,” (he says,) “was occupied in 1848 by a number of pig-fatteners, 23 of whom were summoned before the magistrate at the Hammersmith police-court, who ordered the pigs to be removed, allowing two months for that purpose. The majority of the people complied, but some refused; one of these was fined 10s. a-day till the nuisance was removed, and, after a fine of 2*l.* had been incurred, the animals were taken away. This amelioration was effected before the cholera, which produced such dire results in the Potteries, had broken out in this part of the metropolis: the results, which were most striking, are thus stated by Dr. Lewis in his Report:—

“During the first 10 months of that year (1848), with a population of 518, there were in Camden-place eight deaths, while, after the removal of the pigs, and the consequent cleansing of the street, with a population increased to 532, there was but one death in the corresponding 10 months of 1849,

although a most fatal epidemic has been superadded to other ordinary causes of mortality.’”

Mr. Grainger thus sums up the result of his own observations, with reference to the metropolis:—

“Having,” (he says,) “carefully gone over the whole of the evidence collected by the medical inspectors; having well weighed a large number of facts communicated to me in a series of years by practitioners of all classes, residing both in town and country; and having also considered all the various circumstances that have fallen directly under my own observation, I feel myself justified in stating, that in no one instance has a well-matured plan of sanitary amelioration failed in the great object of all these proceedings—the diminution of sickness, suffering, and death, and the consequent promotion of human happiness. Whether the amelioration consisted in removing a damp and foul evaporating surface by flagging a court, or in promoting the free circulation of air by widening streets and exposing narrow alleys to the renovating influence of the direct rays of the sun, or in the substitution of water-closets for pestilential privies, or in the provision of a pure and ample water-supply, in each and every instance disease, and especially zymotic disease, has decreased, and life has been prolonged. To this statement I know not a single exception.”

Dr. Sutherland states, in regard to the sanitary precautions directed by the regulations of the Board,—

“That the temporary measures for the removal of the localizing causes of cholera, ordered by the regulations of the General Board of Health, have, *cæteris paribus*, been successful, precisely in the ratio of the ability and perseverance with which they have been applied.”

There is an opinion entertained by some persons, that epidemics and the mortality they produce, are necessary evils, and that they are attended at least with this good result, that they keep down the population, the excess of which would occasion worse evils than the natural remedy, severe and painful as that is. A careful examination of facts shows, however, that there is no real foundation for this inference; and tends, indeed, to the very opposite conclusion. It is proved by indubitable evidence, that an excessive mortality, instead of diminishing the population, eventually increases it; the excessive deaths in the worst conditioned districts, being invariably followed by a more than proportionate excess

in the number of births. Thus, in Manchester, while the births are 1 in 26 of the population in the unhealthy parts, they are only 1 in 33 in the more healthy districts; the proportion for the whole town of Manchester being 1 in 25; a proportion which shows the extraordinary fecundity of this manufacturing community: the proportion for the whole of England being no more than 1 in 31, for Devon and Hampshire 1 in 36, and for Salop only 1 in 37.¹

This subject has recently undergone a renewed and very careful investigation with reference to the city of Bristol, by Mr. Clark, one of our Superintendent-Inspectors, who arrives at the following general conclusions:—

“That in those districts in which the per centage of deaths is the highest, the ratio of the increase of population is likewise the highest; or, more simply, *where the many die, the many are born*. Thus, in St. Mary Redcliffe (Table III.), 25 in 1,000 of the population died; 36 in 1,000 were born; and the ratio of increase was 1·08, or 11 in 1,000; being at the rate of 160 per annum. Again, in St. Paul, 24 in 1,000 died; 34 in 1,000 were born; and the ratio of increase was 1·16, or 12 in 1,000; 173 per annum. So, in St. Augustine, the relative proportion is 22 to 31 in 1,000 or in the ratio of 9; 120 per annum. In Castle Precints (excluding St. Peter’s Hospital), 21 and 24, the ratio of increase being only 3 in 1,000; 30 per annum. In St. James, 23 and 29, or 6 in 1,000. Now, had the births to the deaths, in the two latter districts, been in the same proportion as in St. Mary Redcliffe, instead of 24 and 29, they would have been 29 and 33 ($25 : 36 :: 21 = 29$, &c.), and the increase of the population in the seven years, instead of being only 212 and 405, would have been 820 and 807; and, consequently, the respective populations, in the year 1848, would have been 11,546 and 11,362; whereas, the table shows them to be only 10,938 and 10,960. A *great mortality*, therefore, so far from *decreasing*, tends directly, in a series of years, to *increase* the population. This is in accordance with what has been observed in the case of extensively fatal epidemics. Hence, the occurrence of fever or cholera, which prove fatal to so large a proportion of the labouring classes, entails a double expense upon the community at large. First, and directly, by the sickness and mortality, and widowhood and orphanage they occasion; and, secondly, and indirectly, though not less truly, by the additional numbers born, as the sequel, if not the result of such previous mortality. And hence, it likewise follows, as a necessary consequence, palpable to those who

have studied the subject, and gradually becoming more obvious to those who have not, *in the practical and irresistible form of increased poor-rates*, that the neglect of sanitary measures is the neglect of pecuniary economy; and their adoption not more the duty than the interest of a community."

Thus the result of the most recent inquiry has afforded powerful confirmation of the truth of the earlier conclusions as to the effect of epidemics at which Dr. Lyon Playfair had arrived, who says:—

"Careful investigation into facts has brought the indisputable conclusion, that disease and pestilence do not always check the increase of our species. Nay, singular and incredible as it may appear, these scourges are not merely powerless to restrain, but they actually give an impulse to population. The facts exhibited in the preceding sections will, I apprehend, convincingly show that a crowded and unhealthy district, with all its immutable accompaniments of low morals and low intelligence, where the condition of human beings is scarcely above that of animals, where appetite and instinct occupy the place of higher feelings, where the barest means of support encourage the most improvident and early marriages, is not the place where we shall find a diminishing or even a stationary population; for the early unions are followed by early offspring, and although more than half that offspring may be swept away by disease during infancy, yet nearly a third of it will grow up in spite of all the surrounding evils, to follow in the steps of their parents, and, in their turn, to continue a race ignorant, miserable, and immoral as themselves."

There has not yet been time for the development of the consequences of the late epidemic upon the condition of the population, but there is no ground for believing that the results will be dissimilar from those of other epidemics in the particular districts which they ravaged. In the metropolis alone there perished upwards of 6,000 males and females, between the ages of 20 and 60, belonging to the industrious classes. For those prematurely cut off younger persons will be substituted; there will be increased marriages and re-marriages, and an increased proportion of births: and the immediate void occasioned by such dreadful sufferings will be more than filled up by a population on the whole younger, and containing, with the widows and orphans of those who have been destroyed by cholera, a population,

having, on the whole, a larger proportion of dependent members.

We submit that the facts now adduced establish a positive and invariable relation between certain conditions at present existing in towns and cities and excessive sickness and premature mortality among large classes of the people; that these conditions do not inevitably arise out of the existence of town and city populations, but on the contrary that they admit of prevention; and that their prevention is the prevention of suffering, loss of life, physical and moral deterioration, pauperism and crime.

The Legislature having recognised the practicability of the removal and prevention of these conditions, and enacted positive provisions for the accomplishment of this object, we submit that the local authorities charged, with the administration of these provisions, are responsible for neglect of this most important duty.

The Commissioners for the Consolidation of the Criminal Law have adverted to this principle of responsibility and the attachment of legal culpability for the omission of duty in the following terms:—

“ 1. The law takes no cognizance of homicide, unless death result from bodily injury, occasioned by some act, or *unlawful omission*, as contradistinguished from death occasioned by an influence upon the mind, or by any disease arising from such influence.

“ 2. The terms, ‘ *unlawful omission*,’ comprehend every case, where any one, being under legal obligation to apply food, clothing, or *other aid or support*, or to do any other act, or make any other provisions for the sustentation of life, or prevention of injury to life, is guilty of any breach of such duty.

“ 3. It is homicide, although the effect of the injury be merely to *accelerate* the death of one labouring under some previous injury or infirmity, or although if timely remedies or skilful treatment had been applied, death might have been prevented.”

We apprehend that the experience of the late epidemic has afforded stronger evidence than before existed of the amount of evil involved in this description of *unlawful omission*; and has placed in a stronger point of view

the modifications required in the existing law for the accomplishment of the intentions of the Legislature.

In carrying into effect the Act, which, on the approach of cholera in 1848 we were appointed to administer, we framed our regulations with a view to prevent, as far as might be practicable, the outbreak of the disease or where that should be found impossible to check its progress, and to administer relief to the sufferers. Assuming that the measures available for the prevention of cholera were the same as experience had proved to be effectual for the prevention of other epidemics; that the places in which these measures would be first and specially required, and the classes of the population which would most urgently need whatever protection they might be capable of affording, were the places and classes the most subject to typhus and other zymotic diseases, and that it was desirable to bring these measures into operation as long as possible before the actual outbreak of the pestilence, we issued on the 3rd of November 1848, to the Boards of Guardians for England and Wales, and on the 19th of November 1848, to the Parochial Boards of Scotland, the General and Special Regulations, of which we have already given an account in our first Report.

We have subsequently received much evidence as to the practical efficiency of the preventive measures involved in these regulations, and of the spirit in which they were accepted and executed by the authorities appointed by the Legislature for carrying them into effect. The efficiency of all the other regulations depended on the fulfilment of the one which required the Guardians to make out a list of the epidemic localities in their respective districts, and to cause their medical officers to visit and report on the actual state of such localities, and to certify the special measures and precautions which each demanded. It was intended that this first step of preparation for meeting the impending pestilence should be taken simultaneously all over the country as soon as the Regulations were issued, and the common danger appeared to warrant the expectation that this reasonable course would have been pursued. We regret to have

received from our medical inspectors, as the result of their personal observation and enquiry, the following statements :—

With reference to the Metropolis Mr. Grainger reports :—

“ It must be obvious to all unprejudiced persons, that if any combined and efficient efforts were to be made by the agency of sanitary amelioration, to guard the population of this vast metropolis from the ravages of the destructive pestilence with which it was at the period in question threatened, no initiatory measures could be better adapted to secure that all-important object than those set forth in the above regulations; and yet I am bound to state that, with some few exceptions, they were disregarded by the various boards of guardians in London and its neighbourhood for many months after the cholera had given unmistakeable evidence of its presence by severe though restricted outbreaks in divers metropolitan parishes. In spite of these regulations and significant warnings much precious time was thus irrevocably lost; no systematic sanitary precautions were adopted; and I consequently found on visiting various localities on the reappearance of the disease in June and July, as the medical visitors did subsequently in September, that foul and obstructed drains, filthy houses, and overflowing cesspools, were as rife as they were before Christmas, when the epidemic first broke out. This was even the case in the various spots where cholera had formerly prevailed, and where the whole class of epidemic diseases had again and again recurred.

“ On seeking to learn the reason why the preventive sanitary measures prescribed by the General Board had in so many instances been neglected, one of the most fundamental omissions connected with the local management of the late epidemic, and to which, according to my judgment, by far the larger portion of the evils that followed ought to be attributed, came to light. *The parochial medical officers, with some few exceptions, had neither been consulted by the guardians on the measures required at such a crisis, nor authorized to examine into the causes affecting the public health,* and this notwithstanding the express requirement contained in the official regulations, that the guardians should ‘ cause the medical officers employed by them, or specially appointed for the purpose,’ to visit all places where epidemic, endemic, and contagious diseases had of late prevailed, and report on the sanitary precautions required.

“ So early as the beginning of November, 1848, the General Board of Health gave ample and distinct information upon this all-important point; it published a large body of medical

evidence, derived from the most competent observers, to show that, as the neglected and filthy parts of a town,—the parts unvisited by the scavenger, the parts unsewered and undrained, the parts having no proper supply of water for washing away their filth or for domestic use,—were the chosen spots where typhus prevails, and decimates the population, so were they the special seats of cholera; it pointed out that this had been universally proved in respect of the epidemic of 1832; and in order to ascertain if, as could scarcely be doubted, the same law would be observed again in 1848, the General Board instituted extensive inquiries, and all of which distinctly demonstrated that the march and progress of cholera, so far as it had then extended, was, as in the former attack, in the midst of the fever districts.

“Now these districts were as familiar to the medical officers of the metropolis as if they had been marked out on a map; each and all of these gentlemen, had they been required, or even, I may but in too many instances say, had they even been permitted, to lay before the guardians the information they possessed, could, before a single case of cholera had occurred in their districts, have placed their finger upon the very spots and houses which, supposing no ameliorations to be effected, would furnish the victims of the coming disease.

“But, unhappily, after all the information that had been collected and published, after the repeated efforts made by the General Board to ensure to the public the benefit and protection of well-considered and efficient sanitary precautions, the lessons of experience were but too generally neglected by the authorities more especially bound to adopt them; and the population of London, and specially the poorer classes of it, found themselves, when cholera began to rage among them, as unprepared to meet it as in 1832, if they were not, owing to increased numbers, even in a worse position.”

With reference to the observance in provincial towns of the regulation requiring the special examination of epidemic localities, Dr. Sutherland reports:—

“I am warranted by experience in stating that had this process been rigorously carried out the severity of the epidemic attack would have been materially lessened, and a vast number of lives saved; but I am sorry to say that in the majority of instances no efficient steps of the kind were taken, and in many the regulation was totally neglected. It is fortunate that town councils, and other local boards, having cleansing powers, frequently took an independent course, and no doubt much good was done in this way; but in most of such instances the active cleansing operations were not commenced

till the epidemic appeared, and in a few they had to be carried out while the disease was ravaging the towns; while in almost all, that concentration of effort on the epidemic localities, and that continued watchfulness over them which could only have been exercised by a rigid adherence to the letter of the regulations, appeared neither to have been understood nor put in force. I am truly glad to have been able to adduce examples of a very different kind, but the undeniable saving of life which resulted only makes the great losses which have arisen from local neglect elsewhere appear the more lamentable.

“The provisions of the Contagious Diseases Prevention Act, for removing nuisances, were very generally put in force with greater or less effect; but as *continued cleansing and inspection of fever districts* was the preventive measure really required, the simple abatement of a few nuisances, though praiseworthy in itself, and useful so far as it is went, was by no means sufficient to protect the public health.

“A true and intelligent sense of the awful calamity impending over the country, and of the unremitting energy which would be required to prepare the population, as far as practicable, to resist it, would have led to the immediate exercise of all the powers granted as soon as they became known, and to their continued exercise until the last footsteps of the epidemic had disappeared from the country. *The preparatory measures*, generally speaking, were thus only partially and, as a necessary consequence, inefficiently applied. In order to make temporary sanitary ameliorations effective to the preservation of human life, they ought to be in operation for some time before the epidemic prevails in the district. In the great majority of cases, however, the most extraordinary apathy existed in regard to this matter; and it was generally thought to be sufficient to begin the cleansing of bad districts of towns when the disease was in the immediate neighbourhood. I have no doubt that beneficial results arose even from these very imperfect measures; but that they were by no means what might have been attained, is sufficiently proved by the experience of towns where a more enlightened and intelligent management was pursued. Whole months of *preparation* would have been required to fulfil the intentions of the regulations.

“In some cases I am sorry to say I have found nothing done even while the epidemic was ravaging the towns. All the old localizing causes were left untouched. To all intents and purposes no one fact of sanitary science might ever have been ascertained, so far as the local authorities were concerned; and, as might have been expected, the most disastrous consequences have in these instances ensued.”

From the defective manner in which the preparatory measures were executed, it became the more necessary to endeavour to carry into effect measures for checking the extension of the disease, and for affording prompt assistance to the sufferers. We relied chiefly for preventing the extension of the disease on measures for the external and internal cleansing of infected districts; and for the relief of actual sufferers, as well those labouring under the premonitory as the developed stage of the malady, on the organization of a system of house to house visitation; the provision of additional medical assistance; the opening of houses of refuge for the temporary reception of persons whose safety could be secured in no other manner; the establishment of dispensaries and, in a few instances, cholera hospitals, and facilitating the early interment of the dead. The practical results of these measures, when carried into effect energetically and as a combined system, were unexpected by those who witnessed them, and they appear to us to be highly important for future guidance and warning.

EXTERNAL AND INTERNAL CLEANSING.—We stated in our Second Notification that where water is not laid on at high pressure, but can be otherwise obtained, the most efficient means of cleansing would be by the use of a small fire or garden engine; but that wherever water is laid on at high pressure, advantage should be taken of the hose and jet, which removes the dirt from the carriage-way much more effectually than the street-sweeping machine; gives to the pavement the appearance of having been as thoroughly cleansed as the stone steps in front of private houses; and when properly applied in close and dirty courts and alleys, rapidly carries off the filth, destroys offensive smells, and by suddenly changing the temperature and so causing a current of air, produces a sense of coolness and refreshment. We further showed that cesspools may be cleansed in one-third of the usual time, and at one-third of the usual cost, by means of a two-handled pump and hose, wherever there is a sewer within reach into which their contents may be discharged.

We may cite among many other instances of immediate benefit arising from this mode of cleansing, the case of Harebrain and Slater's-courts, and several other courts in Rosemary-lane, Whitechapel.

In December, 1848, cholera broke out severely in two of these courts, under circumstances which gave rise to an investigation by the coroner. Before the disease had yet become epidemic in the metropolis, eight cases of cholera occurred in one of these courts and four in another. The whole of the neighbourhood was found to be in a most disgusting state of filth from the accumulation of fish, soil, offal, refuse of various kinds, and the overflowing of cesspools into the yards, and, in some instances, even into the houses. Directions were given to make a thorough cleansing of these localities by the pump and hose. In the course of three days 70 cubic yards of soil were removed from 12 courts; seven courts were cleansed and the accumulations removed from them; and 12 yards and courts were thoroughly cleansed and lime-whited. The superintendent states, that the result of these labours was most satisfactory; that a change was effected from the disgusting condition with which the inhabitants had been for months annoyed, producing in himself and assistants severe headache and vomiting, to one comparatively salubrious, for which the poor people most strongly expressed their thanks; that the progress of cholera was immediately arrested, and that there was no return of the disease.

This thorough cleansing in like manner exterminated cholera in several other spots on which it suddenly broke out and from which it threatened to extend, as in George-yard, in the same parish, and in several other streets and courts in adjoining districts.

A similar result was effected under the direction of Dr. Sutherland, during a severe outbreak of cholera at Sunderland.

“The chief means of cleansing I advised,” (he says,) “was washing the streets and lanes, and flushing the sewers with the fire-engine, the water for which was forced upwards from the river. The disease immediately subsided on the use of this measure, but increased in a few days, and again nearly

disappeared after a heavy rain-fall, which produced a thorough cleansing. The same occurrence took place a second time after rain, and cholera then disappeared entirely."

In our Second Notification we called attention to the great importance of lime-washing as a measure of cleansing the interior of houses, and recommended the local authorities to engage a sufficient number of persons accustomed to the work, for the express purpose of carrying this purifying process through all houses in the poorer districts which had heretofore been fever nests, and which would therefore probably become the seats of cholera. The experience of Edinburgh, had already shown that, by the aid of two men, with no other implements than a painter's white-washing brush and a pail, a second or third rate tenement containing two or three apartments, might be effectually lime-washed at an expense not exceeding from 9*d.* to 1*s.* per tenement.

"The solution of lime in water," (says Mr. Ramsay,) "is very quickly applied, and when the workmen become accustomed to it, which they soon do, they put the inmates to very little trouble, and do not occasion the usual splashing about of the material, the fear of which creates an aversion to the operation in the minds of indolent and infirm persons, not always to be overcome. When one or two houses have been cleansed and limewashed, many of the neighbours, gratified with the fresh smell of the lime, and its light and agreeable effect on the black and dirty walls, apply to have their houses also washed; and others, seeing with how little inconvenience to themselves it is accomplished, and its agreeable effects, on their permission being asked, very rarely refuse."

Recent experience has proved that this cleansing operation is more effectual in the suppression of disease in general, and cholera in particular, than had heretofore been understood.

"There could be no doubt whatever," (says Dr. Sutherland,) "that the disease was immediately checked in numerous instances by the use of this measure. Houses with filthy, damp, mouldy walls, are peculiarly liable to become the nurseries of fever and cholera; and during the prevalence of the former class of diseases the utility of quicklime-washing had been fully recognised. The General Board of Health, therefore, wisely ordered it to be employed as a measure of prevention against cholera, the favouring conditions of both types of disease having been found to be identical. Numerous cases occurred in which

considerable districts were subjected to the process, both within the houses and on the external walls, and I know of very few instances in which the disease appeared in houses which had been protected in this way."

This operation was again during the recent epidemic carried into effect to a great extent in the worst parishes of Edinburgh, particularly in the districts affected with cholera.

"This process," (says Dr. Sutherland,) "appears to have been mainly relied on as the most effective preventive measure, and I know no city or town where it was adopted to anything like the same extent. It was in Edinburgh that the practice was first successfully adopted to put an arrest on the progress of epidemic typhus, and there can be no doubt that it operated as beneficially in diminishing attacks of cholera in the fever localities. The Canongate parish had nearly every close in it lime-washed; and on making visits of inspection I often found the washers at their work. This poor parish escaped with comparatively little disease.

"In a communication received from Mr. Hay, inspector of the poor of the city parish, he states that in that parish 'the places cleansed by lime-washing and fumigation were 21 closes, 300 houses, 1,060 single rooms, 926 passages, and 1,130 flights of stairs. The cleansing was done by a staff of men, at the expense of the Board, recovered in a considerable number of cases from the proprietors.' The affected portion of the city parish contains about 20,000 inhabitants, and the amount of lime-washing must appear considerable to any one who knows the structure of the houses. It will be seen that the main preventive measures were directed to the diminishing of the absolute number of epidemic attacks, and this may account for the fact that the deaths reported during the late epidemic were only about one half of those reported during the epidemic of 1832, while in all those towns where equally effective sanitary measures were not adopted, the mortality was very much greater from the late than from the former epidemic."

The same results were obtained at Bristol, where there are notorious fever localities, which it is stated—

"Were at once dealt with in compliance with the advice of the General Board of Health. A whole street of fever-courts was thoroughly cleansed and lime-washed, so that on comparing its condition with what it formerly was, the locality could hardly be recognized. All streets requiring constant attention were reported regularly to the proper authorities, and were preserved in a good sanitary condition, so far as the re-

movable causes of disease were concerned. Mr. Goldney reports the results of these measures as follows:—

“ ‘The lime-washing operations were continued throughout the whole time of the epidemic, and certainly obtained immunity from attacks of cholera, even in the most notoriously unhealthy districts. Nearly the whole of a large fever-district was washed prior to the appearance of the cholera, and escaped.’ ”

Dr. Sutherland expresses his full conviction that one reason why the deaths from cholera in Manchester were not more numerous, was the great extent to which lime-washing and house-cleansing were carried by the local authorities.

HOUSE-TO-HOUSE VISITATION.—We founded the recommendation of this important measure on facts which were early brought under our observation establishing the general existence of a premonitory stage in cholera, and proving that the progress of the disease may be almost universally arrested at this stage by appropriate treatment administered within the first few hours after the commencement of the attack. But the evidence on which these conclusions rested was not generally known, or had not been duly considered, at the time when we issued the regulation enjoining the adoption of this measure in the districts and localities in which cholera had broken out. Its efficacy was doubted by medical men; it was undertaken with reluctance by local authorities; it had been tried in no other country, and it was thought of in this by those who had paid most attention to the subject as a thing greatly to be desired indeed, but hardly to be realized. Notwithstanding the efforts that had been made to promulgate information which, if properly attended to, must have rendered the importance of this and similar measures obvious to every one,—

“ There was not wanting,” (says Mr. Grainger,) “ a certain amount of scepticism amongst even the highest ranks of the medical profession. It was my lot frequently to listen to expressions of such incredulity, not unmingled with something of contempt, when the all-powerful influence of local causes in the propagation of fever, cholera, and other zymotic diseases, was asserted.”

The state of mind which admitted of incredulity as to the influence of such causes in the propagation of diseases

of this class was of course incompatible with an appreciation of the true value of the preventive measures which were founded on a knowledge of that influence.

Whatever doubt may have been entertained during the epidemic seizure of 1832, as to the general and extraordinary prevalence of the premonitory symptom, namely, diarrhœa, on the general existence of which the visitation system is founded, the experience of the late epidemic has settled this question. Over the whole of Europe, and in every town and village of this country wherever cholera broke out, it was proceeded and accompanied by an enormous amount of diarrhœa. Long before cholera appeared in Great Britain, we were warned that in Russia, wherever the pestilence was prevalent, the inhabitants in general were seized with looseness of the bowels, and that this was the case amongst all classes of the people, and of all varieties of individual constitution. Of Berlin it was stated that almost every person in that city was affected in the same manner. In Hamburg vast numbers of persons laboured under the same affection. In this metropolis, in the districts in which the epidemic was severe, there was an enormous amount of bowel complaints, consisting essentially of diarrhœa, but accompanied also very frequently with vomiting.

“The surgeries” of the medical officers,” (says Mr. Grainger,) “in all such localities were besieged with applicants; the various dispensaries gave assistance to multitudes of patients; and a vast number applied, in all the poorer districts, to the druggists’ shops; and, besides all these, many neglected to seek assistance, trusting either to various remedies of their own, or allowing the affection to take its course.”

In the towns visited by Dr. Sutherland, Bristol, Hull, Manchester, Liverpool, the same general prevalence of diarrhœa was observed. In Dumfries, Dundee, and the affected parts of Edinburgh, it was the same. In Glasgow, during the height of the epidemic, nearly the whole population appear to have been thus affected; and this was still more remarkably the case in the more limited populations of the small manufacturing villages. At Coatbridge, consisting of a population of 4,000 souls, there were only about 600 persons exempt from the affection. At Carnbroe, a village near Coatbridge, con-

sisting of a population of 1,200 souls, the entire village suffered, with the exception of about 100 individuals.

This very general prevalence of the affection has afforded extensive and varied opportunities of investigating its true nature; and the medical men who have entered into this enquiry have come to the unanimous conclusion that, whenever diarrhœa prevails extensively in a country and district, where cholera is epidemic, that diarrhœa is premonitory of cholera; that it is not a mere coincident or concomitant; that it is not even merely a predisposing condition, like a multitude of other circumstances, but is part and parcel of the disease not to be distinguished from the actual commencement of the most severe form of the malady. Mr. Grainger states that the peculiarities of this affection were so uniform and striking as to leave no doubt on the mind of those who witnessed the attacks, that they were one and all dependent on the choleraic poison.

“Indeed,” (he says,) “I can scarcely recal a single instance among the numerous medical officers whom I had occasion to consult on this point where a different opinion was expressed.”

“So thoroughly,” (says Dr. Sutherland,) “has the unity of cholera through all its stages been impressed on the minds of many eminent practitioners, that I have occasionally experienced considerable difficulty in obtaining statistical data, in consequence of its being found ‘impossible to draw any line between the most severe cases of cholera and the ordinary diarrhœa prevailing, warranted by any pathological distinction.’ This conclusion, which was stated by eminent members of the medical profession, rests on that kind of evidence which is derived from careful observation; but during the late epidemic I obtained striking statistical evidence of the same fact.

The following considerations, among others, appear to have led medical observers to this unanimity of opinion.*

* The following striking evidence of the unity of the disease in all its stages is afforded by the Indian experience. In describing the general effects of the atmosphere, which preceded the outbreak at Kurrachee, Mr. Thom says:—

“The morbid tendency in the system which preceded the pestilence, was equally remarkable among the officers and families as among the men. Every one more or less complained of loss of appetite, nausea, and tendency to diarrhœa. The gastric irritation was very troublesome, and created much thirst, at a moment when the stomach was unwilling to retain fluid. The Lichen tropicus (prickly heat) prevailed to an intolerable degree, and I doubt if a single individual escaped it, not excepting even the old acclimatized Indians, who considered themselves secure against it. Of the 410 cases of cholera which were

1. Diarrhœa suddenly sweeps over the entire area of a city or a district. This happens, perhaps, in the depth of winter when diarrhœa is usually extremely rare: it is preceded and accompanied by violent and fatal outbursts of cholera; if it be not part of the epidemic, what is it? By what external sign or internal pathological character can it be distinguished?

2. The progressive change of the dejections which when carefully observed are found to be at first feculent, then to become gradually paler and more fluid, and, lastly, quite colourless, presenting the characteristic

brought under my observation, I do not recollect one in which the whole body was not covered with this cutaneous disease. A great proportion of the officers were ill with dyspepsia, diarrhœa, &c. It was even found that mild symptoms, closely allied to those of spasmodic cholera, existed among the masses who were not sufficiently ill to be put on the sick list, and constitute what I consider to be the choleraic diathesis, which precedes or ushers in an attack. With impaired appetite there was disinclination for animal food, a craving for drink, burning sensation at the pit of the stomach after eating, and the most trifling physical exertion was succeeded by unaccountable prostration of strength, restlessness, and anxiety. Persons who were delicate, or only returned under the head of 'Dyspepsia,' were often suddenly attacked with 'rice-water' dejections by stool, without any other sign of cholera; others had vomiting of the same without purging, but even two or three scanty motions of this kind left the person shrunk, pallid, and depressed in strength. Those who were walking about at duty complained of fulness, tension, and stiffness of the hands and feet, accompanied by an unpleasant tingling sensation in the palms of the hands and soles of the feet, often pervading the whole extremities, and producing twitching and spasmodic startings of the limbs when in bed. These last were very generally felt. At the same time the body was constantly bathed in perspiration, and the very atmosphere had a muggy close feeling, as if it was a vapour bath. During the prevalence of the disease there had no tendency to diarrhœa or dysentery, although I have formerly suffered from the latter in a severe degree; yet I felt a constant tendency to nausea, loathing of animal food, and seldom could eat anything but dry biscuit, toast, or sugar, although undergoing fatigue of no common kind, and such a season. One night I was attacked with spasms of the calves of the legs, without any other symptoms of cholera except nausea. Two of my three assistants were taken ill in 24 hours after the disease broke out, with diarrhœa and prostration of strength; the other continued at work, but suffered from diarrhœa.

"I refer to this morbidly congestive condition of the system as existing among officers and their families, who are considered to have had a marked exemption from cholera, for it shows that they were equally subject to the atmospheric agencies as the men; and had they been exposed to the same collateral causes as the latter, they would, no doubt, have suffered in an equal ratio. It is this peculiar state of the system which induces me to infer that all were subject to a common uncontrollable cause, which was modified by circumstances under our influence: in one class running into a malignant form, in another so mild as scarcely to merit the term 'disease.'" He adds further, "the symptoms of the disease were the same as those commonly described, only differing in degree in every group, from the most malignant attack to the mildest case of diarrhœa."

rice-water appearance of undoubted cholera. In one instance no fewer than 500 cases of cholera were minutely investigated, and were almost without exception found to have been preceded by diarrhœa of this kind of from ten to twelve days duration ; and in some cases even beyond this period.

Dr. Burrows, who had the charge of the cholera cases that were admitted into Bartholomew's Hospital, says :—

“ From what I could learn from many patients whom I interrogated, and from what I saw in a few at the commencement, I believe there is a period, of uncertain duration, when the stools are feculent, before they assume their peculiar rice-water appearance.”

Dr. Frederick Farre has given the particulars of several cases, in which dark feculent motions preceded the rice-water stools.

Mr. Wood, the apothecary of St. Bartholomew's Hospital, states :—

“ I find it recorded in several instances that the evacuations contained feculent matter even after admission into our wards. In a very great number of other cases, where the evacuations were represented to have been dark and offensive, diarrhœa had existed for a period varying from two or three to ten days. Some of those cases which terminated fatally most rapidly commenced by a copious liquid and feculent evacuation.”

Dr. Lewis, who carefully investigated this point, says :—

“ A few hours diarrhœa of ordinary feculent character presented itself ; this soon increased in frequency, the stools being still feculent but less so than at first. The peculiarity of the diarrhœa consisted in its utter painlessness and in the patient almost always imagining that the bowels would not be troubled any more for a long time. After these symptoms had continued a very variable length of time, from three or four hours to as many weeks, the character of the discharges entirely changed in their nature. This change usually took place gradually, but sometimes suddenly ; from being of the ordinary appearance the ejecta became of a pale white, sometimes almost colourless, so well known by the simile of “ rice-water.”

A similar result was arrived at by Dr. Macloughlin, one of the Inspectors of the Metropolitan parishes, who sums up an extended inquiry in the following words :—

“I am justified in concluding, that I have not found in 3,902 cases of cholera, which occurred in the above nine Unions, one case of cholera without premonitory diarrhœa.”

The experience of Berlin corresponds with these statements. Drs. Reinhart and Leubuscher give the following account of the evacuations:—

“The first stools, so far as we could observe them in the few cases which are available for such examination in an hospital, were in the beginning thin, liquid, and feculent, mixed with the remains of food, and coloured by decomposed brownish or yellowish bile, and generally with numerous mucous flocculi. In a few cases this condition of the stools continued during the whole of the cholera attack; but the most usual course was this, that the remains of the food disappeared; that the stools at length consisted only of a thin, watery fluid, with mucous flocculi suspended therein, sometimes still mixed with green bile, which in some cholera cases, remained during the whole attack. In the greatest number of cases, however, the stools were quite colourless, and without the least admixture of bile: these are the so-called rice-water stools.

“We regard the diarrhœa which arises under the influence of the general noxiousness (*schädlichkeit*) operating at the time of epidemic cholera as the one, and asphyxia as the other point of a progressive series of phenomena, with a number of intermediate stages.”

The great accuracy with which the investigation was made by these authors, who had constant recourse to the microscope, gives to their conclusions great weight.

3. The transition of diarrhœa into consecutive fever, an event of frequent occurrence.

Dr. Sutherland states, that in the beginning of the autumn of 1848 one of the earliest manifestations of the presence of cholera on the east coast of Yorkshire, occurred in a village where typhus fever had been very prevalent, and that the fever cases assumed symptoms of a choleraic character, ending in collapse; that in a number of instances the approach of the epidemic was heralded by the appearance of fever, particularly at Glasgow, where typhus and small-pox were prevalent together; that during one outbreak at Bristol, the earlier cases were decidedly typhoid in their character, and that, as the epidemic advanced, the successive groups of cases became more closely allied to cholera, until the typhoid

substratum presented by the earlier cases disappeared. He also states, that in several instances, particularly in Manchester and Leeds, the decline of cholera was marked by the appearance of fever, of a somewhat peculiar type, which at Leeds resembled influenza in several points.

The same transition of choleraic disease into fever is observed in India. Gastric irritation, with diarrhœa, is there so nearly allied both to cholera and fever, that some medical men return the cases under one of these heads and others under the other; and Mr. Thom states, that in the pestilence at Kurrachee gradations were traceable from the most virulent cases to those of simple diarrhœa, and that although the more remarkable gradations may be arranged under certain groups, yet each was linked to the other by a series of cases scarcely admitting of an arbitrary line of demarcation.

“As cholera closed its career,” he says, “it gradually changed its type to that of fever: a succession of cases might have been placed beside one another, in which a definite boundary could not have been drawn, scientifically, between the two diseases. The proportion that actually passed into fever, was about one in eight; but a large number of cases were returned as cholera, and presented the usual symptoms of this disease for the first six or eight hours. While one out of four or five of these cases ran into spasmodic cholera, the others would terminate in fever, and were registered as such, showing all the characters of low remittent. As these cases were, at the close of the cholera, I really believe that they were men with greater innate stamina, who had either resisted the disease longer, or thus got over it in a more favourable form, than those who had first been attacked.”

4. The comparative mortality of different stages of diarrhœa. Dr. Sutherland states, that of 1113 cases of diarrhœa observed by Drs. A. M. and T. M. Adams,

“The deaths were 6 or 0·588 per cent. In 49 cases of bilious purging without vomiting or cramps there was no death, the number being too small to give such a result. In bilious purging with vomiting and cramps, the cases were 43, and the deaths 3, or about 7 per cent.; of rice-water purging there were 280 cases, and 12 deaths, or about 4 per cent. The addition of other symptoms in this peculiar stage of the disease appears to be attended with a great increase of danger. Out of 108 cases, in which the serous character of the stools was accompanied by vomiting, there were no fewer than 42 deaths, or

nearly 39 per cent., and the addition of cramps to the other symptoms, which occurred in 281 cases, raised the mortality to 149, or 53 per cent. Perhaps no clearer proof could be given of the unity of the disease and its progressive danger. Even where the disease had gone on to cholera, or where the premonitory symptoms had become so violent as to excite alarm, and thus induce the patient or his friends to send for medical aid, a ratio was found to exist between the *earliness* of such application and the result of the treatment. Of those cholera cases which were brought under treatment within six hours of the time of attack, the per centage of deaths was only about 21. Between six and twelve hours, the per centage rose to above 33. Between twelve and twenty-four hours, 45 per cent. died; and when a delay of more than twenty-four hours took place before application was made for medical aid, the deaths rose to above 62 per cent.

Satisfied that this connexion between diarrhœa and cholera, though so certain, and of such vital practical importance, would not be understood by unprofessional persons, and especially by the poorer classes, we were apprehensive that a great loss of life would be the consequence of leaving the poor to themselves until they should of their own accord apply for relief. It appeared to us that it was not sufficient merely to appoint an additional staff of medical officers to be ready to give their assistance when summoned, but that it was necessary to send those officers, provided with the appropriate remedies, into the infected localities, and even to the very houses of the poor, to examine the inhabitants in their own homes, and while engaged in their ordinary occupations, and in this manner to commence the treatment of the disease wherever it should be found to exist, before the persons affected were themselves conscious that they were the subjects of it. This seemed to be the only effectual mode of dealing with a pestilence the peculiar character of which is, that it runs its mortal course in a few hours, and passes wholly beyond the control of human aid and skill, unless preventive measures are taken against it in its very earliest stage. The practical trial of the system of house-to-house visitation, brought out the evidence of the ignorance and neglect of their perilous condition on the part of all classes, but particularly of the poor, to a larger extent than could have been anticipated.

With reference to the metropolis, Mr. Grainger states that to those who are unacquainted with the actual facts of the case, the extent to which the poor, during the epidemic, neglected the premonitory diarrhœa, must appear almost incredible; that notwithstanding the measures adopted by the authorities to advertise them of the necessity of early application, they were generally, when first seen by the medical officers, already in collapse; and that their ignorance of the connexion between looseness of the bowels and cholera, the apparently slight nature of the attack, and especially *the absence of pain*, lulled thousands into a fatal apathy and security. The following are examples of the statements made by the medical visitors.

Mr. Liddle, Whitechapel Union :—

“ It is a well-known fact that the poor would not of themselves make early application for medical advice during the premonitory stage of cholera. In some instances, so slightly did they consider the warning given them by the looseness of bowels, that this was denied when the visitors called; and only when collapse supervened did they acknowledge that diarrhœa had existed, saying ‘ they thought it was of no moment, as they did not feel ill.’ ”

Dr. Gavin, Hackney and Shoreditch :—

“ Previous to the house-visitation, few poor persons were found who were aware that diarrhœa was a premonitory symptom of cholera; if asked if any person were ill, the almost invariable answer was, ‘ No, but my husband or child has got a very bad bowel complaint.’ One reason for this apathy consists in the belief of the poor that everything of the kind ‘ will work itself off;’ this belief probably arising from the frequency of diarrhœa among them.”

Mr. Ferguson, Lambeth :—

“ For a long time, especially till the house-visitation was fairly in work, it was astounding to find to what an extent the poor would allow diarrhœa to go on unchecked. I used to imagine there was a peculiar moral obliquity about persons so attacked, for it was with difficulty I could get information from the persons themselves as to their condition, and usually discovered it from another person in the house. It was no unusual thing to find a person having five or six stools in a forenoon, taking no notice of it, and not seeking for any relief.”

Mr. Adley, Bethnal Green :—

“ I have often met with cases where constant diarrhœa had been allowed to continue upwards of a month, without application for medical relief.”

“ On visiting one of the courts of Lambeth,” (says Mr. Grainger,) “ where the disease had fearfully raged, I was told by a poor woman that she had lost her grown-up daughter; and on my inquiring if she had suffered previously from looseness of the bowels, she said, ‘ Yes, for several days; and being further asked why they did not apply for medicine, the answer was, ‘ Oh, there was no pain, and we thought nothing of it.’”

Mr. Benington, one of the assistant medical officers of Lambeth, reported to Dr. Gavin that he lost 82 cases of cholera, in every one of which there had been previous neglected diarrhœa, of a duration sufficient to have afforded ample opportunity to secure the safety of the patient. One of the surgeons of a large parish informed me that he was called to a child labouring under a fatal attack of cholera; that in consequence he visited the house several times, and on each occasion inquired of all the inmates if any one was suffering from bowel complaint, and was answered in the negative. Soon after the father was seized, and became collapsed; and then it turned out that this person, who was present when the surgeon made his visits, had been suffering for some time with diarrhœa, which he had totally neglected. Very frequently, and especially among the poorest and most destitute classes, the only person who could give information was the patient himself, who, from the intense suffering and profound prostration, often of course was in a state in which no satisfactory replies could be obtained. Little reliance in such cases can be placed on the statement of friends, as the following case will show. In a country town near London, where the disease had been most severe, I visited a case of cholera, and on inquiry of the medical officer if there had been any premonitory diarrhœa, a decided negative was given. I then asked the daughter, a grown-up young woman, if her mother, who had become collapsed in the early morning, had had any looseness of the bowels on the preceding day, when a second negative was given. Not feeling satisfied, I questioned the patient herself, when she answered, ‘ Oh! yes, sir, I was urged all yesterday.’ The fact is, that unless the medical attendant makes a more searching inquiry than it is usually possible for a parochial surgeon, overwhelmed as he is with incessant labour, to undertake, the exact preceding circumstances, especially if it be a question of only slight disturbance of the bowels, to which the poor pay no attention, and usually regard as a salutary operation, cannot be ascertained.

“ The same kind of difficulty was observed in other countries

Thus, at Paris, M. Guérin says that one of his colleagues, who was too young to have seen the cholera of 1832, but who was a careful observer, affirmed that in several cases there had been no premonitory symptoms. Not crediting this, M. Guérin went to the people, and convinced his colleague that in these supposed sudden attacks cholera had pre-existed during several days, and in one case for six weeks. The editor of the '*Gazette Médicale*' also points out the difficulty of ascertaining the existence of the premonitory diarrhœa; and he adduces the case of a man, said to have had a '*foudroyant*' attack, where there had been diarrhœa for two or three days."

Dr. Sutherland states that his experience of the provincial towns of England, Wales, and Scotland, is to the same effect, and attributes this extraordinary indifference, in part at least, to the physical and mental apathy produced by the operation of the poison of the disease on the system, and shows that infected individuals, belonging even to the educated and professional classes, are under the same fatal influence.

"A very ample experience," (he says) "has convinced me that those who are in most danger are least likely to apply, because there is a state of the nervous system connected with a severe epidemic seizure, the tendency of which is to make the sufferer apathetic. The sentient nerves are dulled, and important constitutional changes take place without pain. The discharges which are sapping the very powers of life are permitted to go on, not only without check, but with a certain consent to the feelings of relief which are experienced. No alarm is taken till it is too late, and in not a few instances the relatives have been first aroused to a sense of danger by the last death-struggle of the patient; it has likewise happened that the medical visitor, in going his rounds to seek out cases of diarrhœa, has found the dead bodies of those for whom no medical aid has been sought or procured. Fifty-one such examples occurred in one parish in Glasgow alone. I know an instance of this fatal neglect which happened in the person of an eminent physician, who was particularly successful in the cholera of 1831-32, because he directed his treatment against its early stages, and who, during the late epidemic, was fully alive to the absolute necessity of seeking out and treating the poor in their own houses; nevertheless, with his judgment perfectly convinced as to the danger of delay, and in spite of the urgent representations of professional friends, he permitted a slight attack of diarrhœa to progress unchecked, and did not think it even needful to go to bed, until sudden and fatal collapse put a period to his existence. A very striking case of

the same kind is mentioned by Dr. Malcolm in his Report on the Cholera in Dundee. A system of medical inspection had been introduced into the factories in that town at the instance of the General Board of Health, and it became part of the duty of the mill overseers to warn the operatives to apply for advice immediately on being taken ill. Dr. Malcolm says that one of these overseers ‘suffered from diarrhœa for five or six days without asking any medical aid till it ended in cholera, though he was daily during the time he was ill with diarrhœa reporting to the medical attendant of the mill the cases of this disease that occurred among the mill-workers under his charge.’ This case also proved fatal. I mention these illustrations, because they afford conclusive proof to my own mind of the danger and inutility of trusting to the feelings of a patient as indicating the necessity for medical relief; indeed, it has not unfrequently happened that, while the poor who were under medical visitation were escaping with diarrhœa, their richer neighbours, left to themselves, were suffering from cholera. Sad experience has proved that a time of pestilence is very generally a time of mental apathy; and even during the present epidemic people otherwise intelligent have been content to suffer because ‘all were dying.’ Under such circumstances the visitor, if he discharge his duty efficiently, becomes a messenger of mercy, to rouse the apathetic, to caution the vicious, to enlighten the ignorant, and to heal the sick. The *à priori* necessity for some more efficient method of staying the ravages of cholera than the opening of dispensaries, is thus founded on the very nature of the disease.”

“In Liverpool, as in every town severely visited, the most extraordinary apathy was found to prevail among the poor in making application for medical relief, however freely it was offered to them. Dr. Duncan states, that ‘bowel complaints, particularly when unattended with pain, were looked upon as trifling, and not requiring medical treatment. Many individuals were collapsed before they or their friends thought it necessary to apply for medical attendance.’ It was in order to meet this fatal neglect, that the house-to-house visitation was instituted, but even in districts where it was in operation, many cases of diarrhœa were allowed to go on unheeded, ‘chiefly from the obstinacy of the parties in refusing to believe that painless diarrhœa could be attended with danger, notwithstanding the plain and repeated warnings which were given.’”

“It has been found by melancholy experience both in Dumfries and Glasgow, that neither rich nor poor will, of their own accord, apply for medical aid until the time for its effectual exercise is either past or the chances of recovery reduced to a very small proportion. The premonitory diarrhœa, in a large number of persons, is attended with sensations rather agree-

able than otherwise, the sufferer is lulled into a fatal security and no alarm is taken till it is too late."

That owing to the apathy of the people, produced, in part at least, by the poison of the epidemic, loss of life must necessarily result from the neglect of house-to-house visitation, is further shown by the experience of those who have had the most ample opportunities of witnessing the disease in India.

"That this measure [house-to-house visitation]," (says Dr. Dempster), "is absolutely necessary I feel perfectly convinced, from having had so frequently to lament the infatuated carelessness of soldiers, and the lower orders of civil life on several occasions, for days together neglecting the premonitory diarrhœa, and not applying for medical aid until the urgent symptoms of cholera had made their appearance, and then only at a period of the disease when treatment proved of little avail."

Describing the effect of the epidemic influence on the soldiers and others at Kurrachee, Mr. Thom says:—

"Not a few sunk without suffering or complaint, but lay down to die with an apathy scarcely credible."

In many instances alarm was not taken by the people when they were on the very verge of a violent seizure, and even when the imminence of the danger was unequivocally manifest to the eye of the observer. Some time before what was commonly regarded as the commencement of the attack a change was often discoverable in the colour of the complexion, and the expression of the features. This was certainly the consequence of the poison being already in the system, just as it has been proved by direct experiment that exposure to the epidemic atmosphere of yellow fever, changes visibly the colour of the blood in those who are about to become the victims of that disease; the natural transparent straw colour of the serum of the blood being changed to a deep orange colour. In like manner changes take place internally in cholera, which disorder the action of the vital organs, and communicate to this disease a physiognomy of its own. In an infected locality, says Dr. Sutherland:—

"We find certain appearances among the people, which, when once observed, can hardly be forgotten. The countenance has a peculiar aspect, half anxious, half apathetic. The eyes

are suffused, and often surrounded by a faint areola. The skin has a dusky reddish hue, as if from impeded circulation. I have found such persons averse to exertion, and indisposed to take any steps for their safety. They have usually denied being ill, and refused to leave the locality; and I have not unfrequently been able to predict the deaths of individuals from their positively objecting to being interfered with. Existing cases of fever, or other epidemics, change their aspect and fall rapidly into hopeless collapse."

"The peculiar appearance characteristic of cholera," says Mr. Thom, "was at Kurrachee, often detected in the ranks before the men had any other evident sign of the disease, and for weeks and months after its cessation; we could thereby at once point out those who had recovered. While this guides to an early detection of the malady, it also shows that a peculiar diathesis is in existence prior and often posterior to the climax constituting the danger. * * * I believe that very important changes are effected by the influence of atmospheric agency, before any suspicion is created of their existence. When men were falling by hundreds around us, there were few in health who did not mark their sensations, and all acknowledged that their feelings were strange and indicative of general derangement, while the uniformity of those sensations showed that mere fancy did not produce them."

On the actual trial of the system of house-to-house visitation, it proved to be far more easily carried into effect than was at first apprehended. The presumed difficulty of obtaining an adequate number of qualified persons to undertake a work apparently so extensive and dangerous, was never a practical one. Experience has shown that in the most violent and extensive outbreaks of the pestilence, its virulence is invariably confined to circumscribed localities. Even in the districts the most severely attacked the great bulk of the mortality always occurs within a very limited space, while the disease seldom lasts long at any one point, but attacking a number of points in succession. This is the law of the epidemic.

A large staff of visitors, therefore, is not required. A small number, properly organized and directed, are capable of commanding a very extensive district, and may hunt out the disease therein wherever it exists; but this service requires to be performed with all the precision of a military movement.

A full detail of the organization ordinarily required and found in practice efficient, is given by Dr. Sutherland in his Report, Appendix A, p. 51, *et seq.*; and by Mr. Grainger, with reference to the Metropolis, in the 9th section of his Report: Appendix B.

The general and uniform results of the adoption of this system were:—

1. The discovery of a number of dead bodies, the individuals having died of cholera without having received any medical assistance whatever.

2. The discovery of a number of cases of cholera in various stages of developement, proceeding with different degrees of rapidity to a fatal termination, not only without medical assistance, but without the slightest apprehension of any danger on the part either of the sufferers or their friends.

3. The discovery of a vast number of cases of diarrhœa, some of them bilious, some with rice-water purging, and others advanced to the stage characterised by serous discharges, without any medicine having been taken, without any alteration having been made in diet, without any thought of sickness, and much less any apprehension of the actual commencement of a mortal ailment.

4. The application of a great number of persons to the various dispensaries for the immediate and gratuitous supply of medicines, the opening of which in convenient situations formed an essential part of the visitation system. One special duty of the visitor being to direct all persons who might be taken ill after his visit to make instant application for aid to the nearest dispensary.

5. A gradual and progressive diminution of the developed, and an apparent increase of the premonitory cases, the diarrhœa taking the place of cholera.

6. A decided diminution in the number of attacks.

7. A decided diminution in the mortality.

8. Sometimes a rapid cessation of the disease, and invariably a decided and steady progress towards it.

The effect, however, was often less striking than might have been expected from the real efficiency of the mea-

sure, first because it was impossible to carry into effect a universal house-to-house visitation ; the regulations of the General Board of Health being intended only for the necessitous : neither the richer portion of the community, nor even persons in the receipt of wages being chargeable on the parochial Boards ; and several lamentable instances occurred in which the wealthier classes perished while the poor were saved. Secondly, because the attack of the epidemic was not always a single one. On the contrary, the pestilence commonly attacked large cities, as if they consisted of groups of villages ; first appearing in one district or one portion of a district ; decimating that ; then disappearing there, and breaking out in some other locality. It is obvious, therefore, that even if the preventive measures had actually stopped all the cases in one locality, still the cases resulting from the fresh seizure of another locality would be recorded in the daily returns for the whole city, so that the apparent would be smaller than the real effect produced. It is only when the population is comparatively small, when an efficient preventive medical staff is placed over it, and when the epidemic seizure is a single one, that the effect of the system of house-to-house visitation with its open dispensaries and extensively distributed notices, is seen in its just light.

A selection of the results obtained in some of the towns in which this system was carried into effect with the greatest energy and completeness, may suffice to illustrate its working and the benefits which followed its adoption.

DUMFRIES was the first town in which the experiment was tried. The population, about 10,000, was not too large ; the epidemic seizure was a single one, all the cases, almost without exception, were preceded by neglected diarrhœa. The circumstances were, therefore, favourable for testing the efficiency of the visitation system.

Before any arrangements were made for its adoption 147 of the townspeople had perished ; before it could be put into full operation there had occurred 250 deaths. During the three first days in which it was only partially

in use, the fresh attacks daily were respectively 37, 38, 23; and the deaths 9, 6, 9; on the three succeeding days, when it was in full activity, the attacks diminished to 11, 14, 12, and the deaths to 7, 3, 6; and on the following three days the attacks sunk to 8, 4, 2, and the deaths to 6, 4, 5; in three days more the epidemic was at an end; a few isolated cases only occurring during the succeeding eight or ten days.

The diagram, plate 8, taken from Dr. Sutherland's Report, exhibiting in contrast the progress of cholera and diarrhœa, during the prevalence of the pestilence in this town, shows how suddenly and completely cholera was struck down from the day that the full staff of visitors, 14 in number, were in operation. The black line shows the large number of premonitory cases treated by the visitors, and the red line the arrest of cholera, caused by the prevention of its development.

The result was similar at Paisley. The suburb of this town, Charleston, was placed under active visitation at a period when the new attacks of cholera amounted to 23 daily. On the fourth day after the system was in complete operation the attacks fell from 23 to 3 daily, and in a few days more the pestilence had ceased. In the other districts in Paisley which were not under visitation the disease went on after the last case had occurred in Charleston. See Plate 6, Appendix A.

The first epidemic seizure in INVERNESS was limited to 20 cases of choleraic diarrhœa; of these the first 10, being neglected, all proved fatal; the last 10, being brought under visitation, and thereby under immediate treatment, all recovered.

In GLASGOW there were brought under visitation 13,039 cases of premonitory diarrhœa; of which nearly 1,000 had advanced to the stage of rice-water purging; yet, out of this total number only 27 passed into cholera. Taking into account the number of unrecorded cases, it is probable that the real number thus brought under early treatment was not less than 15,000.

The PARKHEAD district of the Barony Parish, Glasgow, is a circumscribed one, so that the population could be placed under comparatively strict inspection. So

efficient was the visitation in this district, that throughout the entire epidemic the premonitory cases amounted to no less than 2,379 per cent. of the cholera cases. On some days the premonitory cases were to those of developed cholera in the proportion of 3,000, 3,300, 5,900, and even 6,000 per cent., and the result on the cholera, as will be seen by referring to Table IV. and the diagram plate 7, Appendix A., was the complete breaking up of the disease, leaving entire days during which all the cases appeared in the premonitory schedule only, to which it was indeed confined, with a few exceptions, during the whole month of February.

In DUNDEE the visitors discovered 10,792 premonitory cases, of which 705 were on the verge of cholera.

The opinions expressed by the medical officers as to the result of the visitation in these and other towns are stated in Dr. Sutherland's Report. (Appendix A.)

In MANCHESTER the visitors discovered, in all, 3,807 premonitory cases, 261 of which were on the verge of cholera; yet only 27 actually passed into it; and one-half of these were, within the three first days of the visitation, and before it was brought into full operation. Plates 11, 12, and 13, from Dr. Sutherland's Report, show that within a few days after the visitation was in activity, the developed cholera almost entirely disappeared, and the influence of the epidemic was confined to the production of diarrhœa. Plate 11 shows the result for the whole township; and plates 12 and 13 that for each of the five districts, in which it will be observed that the disease was retained and cured in its premonitory stage, and, as a consequence, cholera disappeared. The black lines mark the proportion of diarrhœa cases, and the red lines those of cholera.

"It appears to me," (says Dr. Sutherland,) "that these diagrams exhibit as strong proofs of the success of the preventive measures adopted in Manchester, as the nature of the case admits of."

The medical superintendants and officers were so struck with the immediate check put upon the full development of cholera, that they report severally:—

"Cholera cases diminished at once and rapidly, incipient

cholera or diarrhoea raged for nearly three weeks after the measures were in operation, but confirmed cases had become of rare occurrence."

"The working of the system has been admirable; it is the sole cause to which the rapid decline of the epidemic can be ascribed; the house visitor appears to banish the disease as he progresses.

"The daily searching inspection instituted appears to me to be the only decided means of staying the progress of the disease and of saving life.

"From the very day of the system being established, as will be seen by the returns, the disease gradually gave way, each day bringing in succession a most extraordinary and rapid decrease.

"By inspiring confidence, by the immediate and effectual treatment which it affords to all premonitory cases, and by the removal of many causes of disease which would have been otherwise overlooked, I have come to regard house-to-house visitation as the most important of the preventive measures in epidemic cholera."

The deplorable consequences of the neglect of the authorities of the united parishes of HULL in delaying the adoption of preventive measures has been elsewhere stated. When at length the town was brought under visitation, there were discovered 5,894 premonitory cases, of which 351 were passing into cholera; but the progress of all these was arrested with the exception of 17. A reference to Table V. in Appendix A., will show the enormous preponderance which the premonitory held over the developed cases. In this town the registrar's returns, as compared with the deaths occurring in the practice of the district medical officers, when the regulations of the Board were in full operation, exhibit the melancholy spectacle of the better classes, and particularly the industrious artizans, in the receipt of wages, perishing in large numbers, while the very poorest people were placed by preventive measures in comparative security. Dr. Cooper, who had the superintendence of Sculcoates, after adverting to the sad proof of the virulence of the disease afforded by the number of the medical staff that were attacked, as well as the numerous other persons in the higher walks of life, states, that after the humbler classes, who were the chief subjects of the measure, were placed under visitation, the

disease maintained a singularly equable and rapid decline.

The conduct of the authorities of SHEFFIELD affords a striking contrast to that of the local Board of Hull.

“Soon after Asiatic cholera appeared in this country,” (says Dr. Sutherland,) “a few members of the Sheffield Board of Guardians, in conjunction with their clerk, Mr. Watkinson, began the work of preparation for the anticipated outbreak of the epidemic. They took the documents published by the General Board of Health as their guide, and proceeded with the determination of doing all that could be done, and at whatever cost, to save the town from the danger which impended over it.

“Active measures were taken for continuous cleansing and for keeping the town free of nuisances, and suitable officers were appointed for the purpose, the object being to remove as far as practicable every source of atmospheric impurity, so as to enable the population to resist the epidemic influence when it came upon them. The gentlemen on the Sanitary Committee availed themselves of every means of information, and when the advance of the disease became more threatening, they summoned the medical profession together, and consulted with them in regard to the proceedings which ought to be followed.

“The results of this cordial co-operation were most beneficial. With a thorough knowledge of the habits of the people, and an enlightened appreciation of the importance of the great leading points in the preventive measures laid down by the General Board of Health, and guided also by the results of experience elsewhere; the Committee agreed to a certain definite plan of procedure of a medical preventive kind, to be put in operation as soon as the epidemic appeared.

“It is hardly possible to overrate the importance of these preliminary steps. Unlike other Boards of Guardians, they had used the most available means for preparation, and they had nothing to seek when the emergency arrived. All their plans of operations were settled, and their machinery arranged. In this the Sheffield Board of Guardians stands almost alone. They are, I believe, the only body in the country which had the enlightenment to perceive the full extent of their duty, and the courage and energy to perform it. This, I believe, was done without regard to expense, and in the firm conviction that apart altogether from the humanity of the course they had taken, the ratepayers would be large gainers in the ultimate saving of widowhood and orphanage which was, without doubt, effected.

“In addition to the ordinary cleansing operations, the lead-

ing points which were kept in view in the plan of relief measures adopted, were: 1st. Directing the medical treatment almost entirely against the premonitory period of the disease. 2nd. The removal of the healthy from infected houses and neighbourhoods. 3rd. The use of quick-lime wash to a large extent as a preventive measure. 4th. The home treatment of cholera cases.

“It will be perceived that the Board of Guardians adopted those principles so often fruitlessly enforced on other similar bodies by the General Board of Health.”

From the period when the first outbreak of cholera took place in the town to the final disappearance of the epidemic, there were brought under treatment 5,319 cases of diarrhœa, and 76 cases of cholera. It is stated, that not a single case came under observation in which diarrhœa passed into cholera, after treatment; and it appears, that out of 145 persons admitted from infected houses into an excellent house of refuge, one-half of which became affected with diarrhœa, only two deaths occurred.

“No person,” (says Dr. Sutherland,) “who looks at the nature of these cases, can doubt that they would have exhibited a much greater proportion of cholera attacks had the preparatory steps not been taken. The population was in fact enabled to resist the epidemic influence, and the small number of cholera cases when compared with the large number of those of diarrhœa is a sufficient proof that the object of the sanitary measures was to a great extent fulfilled.

“It will be perceived, that Sheffield exhibits the first and only instance of a faithful and voluntary application of those principles of preventive medicine which the General Board of Health has been so long endeavouring to enforce. The authorities recognized the unity of the preventive measures, and the necessity of working them all together, in order to obtain the best practicable result. While in almost every instance, in which the General Board of Health has been called on to interfere, measures have had to be taken hurriedly and on the spur of the moment, not only to prevent or limit the ravages of the epidemic, but to endeavour by every means to save human life from instant danger.”

It must be observed, however, that the modified plan of medical inspection adopted at Sheffield, instead of the simple house-to-house visitation, was not successful.

It failed to bring the cases of true cholera that did occur under early treatment; for it is expressly stated, that they were either in a state of collapse, or bordering upon it, when they were found.

“Had the visitation of houses,” (observes Dr. Sutherland,) “been so active as to have ensured the early discovery of all these cases, either in the premonitory stage or before the period of collapse, the carrying out of the preventive measures would have approached as near to perfection as possible; but the occurrence of so many cases in the stage of collapse confirms the experience of other localities as to the danger of trusting to the poor to apply for medical aid of their own accord. I attribute the comparative immunity which Sheffield enjoyed from developed cholera, and the appearance of the epidemic in its milder forms, mainly to the very efficient preparatory measures which were instituted and actively carried out for so considerable a time before the disease showed itself among the population.

“The removeable causes were summarily and effectually dealt with, and hence districts escaped with diarrhœa, which, in other towns, would probably have been the seats of cholera. Causes which there were no legal powers to remove were left in operation, and under these cholera localized itself. Perhaps no more instructive illustration of the connexion between epidemic attacks and local sanitary defects could be given.”

While these various measures were in operation in the principal towns, nothing efficient was done or attempted in the Metropolis. The arrangements adopted in the city of London Unions were so unsatisfactory as to lead to the interposition of the Lord Mayor and the City Committee of Health. We repeatedly and earnestly urged on the Boards of Guardians of the other metropolitan districts the importance to the saving of life of making immediate arrangements for the introduction of special measures of prevention, suited to their respective localities; but our representations were made in vain. The local authorities could not be induced to carry into effect the preventive measures we proposed, and we ourselves had no means of putting them in practice. Our entire staff consisted of two medical inspectors, one of whom was laboriously and exclusively occupied in grappling with the epidemic in Scotland; and the other, during the 11 months while the pestilence was incu-

bating in the metropolis, besides being called to visit various towns in England in which sudden and violent outbreaks of the disease occurred, was engaged in attending to the demands made upon him by the several metropolitan districts and establishments in which the disease was already fully developed, and, in some instances, prevailing with extreme violence. It was not until the last week of August, 1849, that is, eleven months after the actual appearance of the disease in London, and when the returns of the deaths from cholera amounted to upwards of 1,200 weekly, that we were enabled to engage the services of a sufficient number of medical men to superintend the visitation of the infected districts. Even then several Unions and parishes, among which were some of the most wealthy and populous, positively refused to comply with our directions, so that several of the largest districts were never under visitation at all; in others the plan was adopted only after delays which cost the lives of many hundreds of the people, and in all it was so partially and imperfectly adopted, that we are aware of scarcely a single metropolitan parish in which it can be said to have been thoroughly in practice.

At length, with a staff of eight medical men to superintend the visitation for the whole of the metropolis, and with such medical visitors acting under them as the Unions and parishes could be induced to appoint, the system of visitation was brought into operation in the first week in September, at a period when the weekly deaths from the pestilence amounted to 2,026. The details of the arrangements and the precautions adopted to secure the accuracy of the returns are fully described in the 9th section of Mr. Grainger's Report, p. 145, *et seq.*

The general results of the visitation, imperfectly as it was carried into effect are the following:—

During the 8 weeks in which it was in operation, namely, from the 1st of September to the 27th of October, 1849, with the above staff of medical officers superintending the visitation, there were discovered and placed under immediate treatment:—

Cases of premonitory diarrhœa	43,737
Cases approaching to cholera	978
Cases of developed cholera	780
Cholera corpses, cases in which death took place without any medical attendance whatever	17
Cases which passed into cholera after treatment	52

From this return it appears that the cases of premonitory diarrhœa were to those of developed cholera nearly as 60 to 1; and that of these premonitory cases, even including the 978 which were on the verge of cholera, not 1 in 800 passed into the developed form of the disease.

For the purpose of exhibiting a few of the results somewhat more in detail, we select three instances in which the visitation was comparatively the most efficient.

BETHNAL GREEN.—Before this district was brought under visitation, in the three weeks August the 11th, 18th, and 25th, the deaths from cholera were respectively 35, 125, and 127. So great was the virulence of the disease that, in the four days from August the 12th to the 15th there took place no fewer than 92 deaths from cholera, and three from diarrhœa.

The registrar of the district states in his returns:—

“The 12th, 13th, and 14th of this month will long be remembered in this neighbourhood, the outbreak of this fatal disease being without any adequate preparation—surgeons wanted in many places at once: the hurried passing and re-passing of messengers, and the wailing of the relatives filled the streets with confusion and woe, and impressed us all with a deep sense of an awful calamity.”

“In the previous week’s return the Registrar remarks, ‘Medical men are called in when the people are dying, but it is then too late.’ Up to this time no house visitation had been attempted, and the medical staff, as to numbers, was totally insufficient to undertake the work.”

Under these circumstances we issued, on the report of the superintendent of the district, a special order directing the immediate appointment of four medical visitors, one additional medical officer to aid in treating cholera cases in the infirmary, a sufficient number of nurses to

take charge of persons attacked; suitable hospital accommodation; a dispensary to be kept open day and night in the centre of each infected locality, two inspectors of nuisances, and a staff of lime washers. Under the urgent circumstances of the case, the Board of Guardians appointed no medical visitor for five days; they provided no nurses; they established no hospital; they opened no dispensary; they appointed one inspector of nuisances instead of two; and they made no provision for extensive and effectual lime-washing.

With the imperfect means at his disposal the visitation was commenced under Dr. Gavin, the medical superintendant of the district, who states that the disease chiefly prevailed in a space comprised in about 400 yards by 150. The registrar of the district in the previous week recorded:—

“From the registration of the last fortnight I find that 99 out of 107 fatal cases of cholera and diarrhœa have occurred in a space occupying less than a tenth of my district.

“Here then,” (says Dr. Gavin) “was the proper spot to which to allocate the medical visitors, and to test the practical utility of the preventive measures adopted. The amount of deaths in the week, ending 31st August, in the locality referred to, was 48 of cholera and 6 of diarrhœa. In the week succeeding it was 27 of cholera and 4 of diarrhœa.

“All care has been taken to include every case of the disease which can be discovered to have died elsewhere than in the district, but which could fairly be attributed to the district. *A reduction in the mortality of 42·6 per cent. was effected in the first week of the visitation.* As it might be objected that this was merely the reduction natural to the decline of the epidemic, it is necessary to contrast it with the mortality in the town district, where the epidemic had broken out at nearly the same time, and which was then only partially under visitation. In the week preceding the visitation the mortality from cholera and diarrhœa was, 31 cholera and 4 diarrhœa. In the week succeeding it was, 36 cholera and 2 diarrhœa, thus showing an increase of 8·5 per cent. on the previous week, and a difference, as compared with the Hackney-road district, of 50·1 per cent.

“Up to the evening of the 7th September, which may be fairly called the first week of the visitation, as it was not properly organized till the 4th, no less than 1,025 cases of diarrhœa, 38 cases of approaching cholera, and four corpses had been discovered by the visitors.

“In the second week the following were the results:—

Cases of diarrhœa	1,331
Cases of approaching cholera	26
Cases of cholera	8
Corpses discovered	2"

From a table given in Dr. Gavin's Report it appears—

"That in 54 days, no less than 14,845 persons received gratuitous medical relief, of which number 9,992 were discovered by the medical visitors to be actually suffering from choleraic disease. This gives a proportion of 1 in rather more than every 8, or, in decimals, 1 in every 8·51 inhabitants, who were discovered by the visitors to be actually ill from choleraic disease; and, in every 5, or, more exactly, 1 in every 5·19 inhabitants, who were treated at the public expense. This proportion is so great as to prove two facts:—First that choleraic disease prevailed in this parish to an enormous extent; secondly, that the means used to check the disease were most efficiently brought home to a very large proportion of those who were affected. On the very first day of the visitation, with but one visitor, four cases of unattended cholera were discovered; and on the next day three cases. On the third day, with two visitors, three cases, likewise, were discovered.

"It further appears that, within four days after the visitation had been thoroughly organized, 47 cases of approaching cholera, 2 cases of cholera, and the corpses of five persons who had received no medical relief whatever, were discovered. These numbers formed the following proportions of the total amount of the same kind of disease discovered in the whole of the remaining period of the visitation:—39·2 per cent., 61·5 per cent., 62·5 per cent.; thus proving that immediately on the commencement of the visitation the disease received a marked and sudden check.

"The total number of cholera cases which came under treatment during these nine days, exclusive of the workhouse cases, which, of course, were not amenable to the system of visitation, amounted to 183, while only 199 came under treatment during the subsequent 45 days.

"The disease is thus shown to have been remarkably amenable to measures of prevention when carried out with vigour and promptitude; and I am positive I understate the truth when I give it as the result of all my experience and knowledge, that, with these measures in full operation, at the commencement of the epidemic, and before the severe outbreak in the 11th and 12th of August, in the town and Hackney-road districts had taken place, the lives of three-fourths of those who subsequently perished in the spots already defined as the hotbeds of disease might have been saved."

SHOREDITCH.—In this parish 8,742 cases of diarrhœa, 30 cases approaching cholera, 11 of fully developed cholera, besides 8 cholera corpses were discovered by the visitors, irrespective of 12,873 persons who applied for and received relief at the surgeries of the medical officers. Altogether, there were brought under treatment in this district 21,116 cases of premonitory diarrhœa; 343 cases approaching cholera, and 197 cases of developed cholera. Of the number of the cases of diarrhœa discovered on visitation only one, and of the cases approaching cholera only two are known to have passed into cholera.

“These results being so remarkable,” (reports Mr. Grainger,) “it is proper to state that Dr. Gavin took every precaution to secure accuracy. He met the medical visitors every night to receive a detailed account of the day’s work. Whatever case of premonitory attack passed into cholera, after being discovered and treated by these gentlemen, was reported; but as some of the cases discovered by the visitors might have subsequently passed into cholera while under the charge of the parochial medical officers, Dr. Gavin established inquiries with reference to the point. The answers of these officers were to the following effect:—‘My experience does not furnish me with a solitary case of simple diarrhœa under treatment passing into cholera.’ ‘I know of no case of simple diarrhœa sent me by the visitors passing into cholera.’ ‘I am not aware of any cases of diarrhœa sent me by the visitors having subsequently passed into cholera.’”

It may, therefore, be safely concluded from this scrutiny that, even supposing that some few cases did pass into collapse unknown to the visitors, the results of seeking out and promptly treating diarrhœa in this parish, were pre-eminently successful, preventing a large number of patients from falling into the fatal stage of collapse.

In the Western District comprising St. George’s Hanover Square, Kensington, and Chelsea, there were discovered during the few weeks in which the visitation was in practice upwards of 7,000 cases of premonitory diarrhœa, only seven of which appear, after careful inquiry to have passed into cholera. Dr. Waller Lewis, the superintendent of this district, states:—

“That the visitation was no sooner in full operation than the number of cases of cholera rapidly diminished; a greater proportion of recoveries took place among the individuals who

were attacked; instead of cholera the worst form of the disease showed itself in rice-water purging, and soon even this choleraic diarrhœa became rare, and the disease made its last efforts in the form of simple feculant diarrhœa, a stage in which it could be mastered almost with certainty."

The following occurrence is illustrative of the result of efficient visitation. The parish of St. George Hanover Square, had authorized their medical officers to engage whatever extra medical assistance they might deem necessary during the prevalence of the epidemic. They were of opinion that no extra assistance was required; two facts, however, which were one day brought under the notice of Dr. Lewis, at an interview which he had with the medical officers, satisfied him that they were in error. One of the surgeons of the out ward had been called the day before to two cases of cholera; in one of which death took place before he arrived at the house; and in the other the patient lived only one hour and a half after having been first seen. Admitting the danger of thus waiting till they were sent for, the medical officers now consented to the adoption of a vigilant visitation. Four assistants were engaged for this purpose.

"From that time," (reports Dr. Lewis,) "although very many severe cases of diarrhœa were discovered and treated, the medical officers were not called upon to attend a single fresh case of cholera. The disease soon abated, so that the visitors were dispensed with after having been employed a fortnight. During that time they discovered about 290 cases of premonitory symptoms, nearly 40 of which they believed would have run into cholera if not brought under treatment."

The diagram facing page 26, in addition to showing the weekly mortality from cholera during the late epidemic, and the corresponding atmospheric conditions, indicates in a striking manner the result of the preventive measures which were at length adopted in the metropolis. In 1832 no preventive measures were in operation; and until the last week in August, in 1849, the metropolis was equally without the protection of any such measures; so that up to this period the disease in both cases went on unchecked. In the first week of September 1849, the house-to-house visitation was brought into active operation. The deaths in that week

were 2,200, but from that time the further progress of the epidemic appears to have been arrested. This will be seen by tracing the blue line on the diagram. No new outbreak was witnessed; the mortality fell in one continuous and rapid course, and in seven weeks had entirely ceased. In 1832 the mode in which the epidemic terminated was widely different. The highest mortality, 900, was attained in the third week in July; it then fell in six weeks to 250; rose during the next four weeks to 650, then went down to 400; rose in the next week to 600, and afterwards, after two more outbreaks of less intensity, gradually declined, and the disease finally disappeared in the latter end of November, *eighteen weeks* after the greatest mortality had occurred.

This would seem to be conclusive evidence, that the house-to-house visitation was the primary cause of the sudden arrest of the epidemic in 1849, as in the one case the mortality fell from 2,200, and the epidemic was at an end in seven weeks, whilst in the other it was 18 weeks, or nearly three times as long before it completely subsided.

We may add to these examples those afforded by another and entirely independent body of observers, namely, the Superintending Inspectors under the Public Health Act. who, in conducting their local preliminary inquiries since the epidemic of last year, have had evidence laid before them as to the efficacy of house-to-house visitation in arresting cholera in districts where the system was carried out by the Boards of Guardians themselves.

In Mr. Lee's Report on Nantwich, Mr. Williamson, Union Medical Officer, states, that—

“The house-to-house visitation was adopted on the 14th July, and was continued with great success until the decline of the disease. The third day after the visitors commenced, I visited and prescribed for upwards of 50 cases of diarrhœa. In many of those cases the parties would not in all probability have applied for medical assistance, and the diarrhœa would undoubtedly have run on to cholera. In the week before the visiting commenced, there were 37 deaths; afterwards, the diarrhœa cases increased, but the lapsed cholera declined.”

A similar statement is made by Mr. Nicholson, Surgeon to the Huntingdon Union, who says, that—

“Two cases of Asiatic cholera have occurred, while bilious cholera and diarrhœa have been very prevalent and severe, mostly terminating in low typhoid fever. House-to-house visitation has been adopted, with a decided remission of these disorders, owing to the early employment of remedies; had this system not been efficiently carried out, it is impossible to say how frightful would have been the progress of the epidemic.”

In reviewing the general results of this important measure, it is proper to premise that in consequence of information which we received that our regulations were not complied with, even in places in which cholera had actually broken out, and was committing great ravages among the people, we found it necessary in numerous instances to issue Special Regulations, and to direct our Medical Inspectors to visit the parishes infected, in order to see to their execution. Previously to the adoption of this measure, with one or two exceptions, no effectual steps appear to have been taken to bring the disease under early treatment in its diarrhœal stage, and consequently we have received no account of the number of premonitory cases which, in these instances, ushered in and accompanied the first outbreak of the pestilence. Returns, it is true, were obtained from some infected localities, but the whole number of premonitory cases entered in them was so insignificant, as to prove that no machinery was in action by which the real facts could be known. No sooner, however, were the measures directed in operation, no sooner were the medical visitors in the infected districts, inspecting the houses of the sufferers, giving assistance on the spot to those already attacked by the disease, and directing others, probably the next to be seized, to the dispensaries, where, in their absence, they might receive prompt relief, than the returns showed a remarkable change. The existence of the premonitory stage was now, in every instance, without exception, reported in enormous numbers, and the succeeding returns invariably indicated a corresponding diminution in the proportion of developed cholera, and in that of the deaths. Even under the best organized

system of visitation, however, the reporting was scarcely ever full and accurate, although it was probably as much so as could have been reasonably expected, considering the urgent and incessant calls on the time of the medical officers. From numerous districts severely visited by the pestilence no returns at all of premonitory cases were received, while in several of those about to be enumerated, the list of dispensary cases is altogether omitted. Notwithstanding these deficiencies, the returns from Dumfries, Glasgow, Manchester, Hull, Sheffield, Liverpool, Wolverhampton, Dundee, Hamilton, Coatbridge, Carnbroe, Leeds, Sunderland, Bristol, and the metropolis, a portion only of which was under visitation, and even that at a very late period of the epidemic, exhibit 130,000 premonitory cases in various stages of development, about 6,000 of which were passing into developed cholera. Of this enormous number of premonitory cases, not above 250 actually went on to the developed stage of the disease, and the reports show that the larger part even of this small proportion occurred within the first few days of the introduction of the preventive measures, and before they came into full operation. Thus in certain of the metropolitan parishes nearly 28,000 premonitory cases were treated in one month, and of these 11 passed into developed cholera, but seven of this number occurred in the first week. In Manchester, out of 3,807 premonitory cases, a comparatively large number (27) passed into developed cholera; but this happened with respect to 13 of these cases in the first three days, before the visitation was properly organized; and out of the whole 27, 22 went into cholera within the first week. Of all the cases that passed from the premonitory into the developed stage, at Hull, only two did so during the last 20 days of the visitation; and the returns show that similar results took place in nearly all the other districts.

We have selected these 15 towns as examples of the results effected by preventive measures, because those measures were there carried into operation more systematically than in any other towns, and because more complete statistical returns of the results have been received

from them. In Table B will be found an enumeration of about 700 cities, towns, Unions and parishes, many of them returned to us as having been severely visited by cholera, and we have reason to believe that other places were attacked, from which no returns whatever were made. In some of those places the Boards of Guardians and other local authorities may have adopted preventive measures with success, but imperfectly as those measures have been in the great majority of instances carried into effect, the 15 towns above enumerated are those in which they are known to have been the most systematically and perseveringly practised, and from which reliable statistical returns of the results have been received. From these returns it appears, that out of a population thus limited, compared with the extent of the population attacked by the pestilence, no fewer than 130,000 persons in the first stage of the disease, were by the system of visitation, sought out and placed under immediate and appropriate treatment, with such efficacy, that of this whole number, only 250 actually went on into developed cholera, although no less than 6,000 were, when discovered, on the very point of passing into the fatal stage of the malady.

The total returns of cases of developed cholera, during the same period, from the 15 towns above enumerated, including those under the charge of the ordinary medical officers, as well as those discovered by the visitors, amounted to about 8,500. Of those cholera cases, which were discovered by the medical visitors, a large proportion were either in perfect collapse or in a state nearly approaching it. None of the returns show the precise number of deaths among the cases that were discovered, but it is known that the mortality even from developed cholera is much less in localities under visitation than in places where the infected are left to apply for relief of their own accord. Assuming, however, that the deaths were in the usual very unfavourable proportion of one-half of the attacks, it will follow that in the most populous cities of Great Britain the total deaths which occurred under the preventive measures, where these were specially enforced, were only about 4,250. This result was

obtained under the disadvantage of having to introduce a new machinery often in the very midst of the epidemic seizure; not unfrequently in spite of the opposition of the Boards of Guardians, who in several instances persisted in attempting to break it up; in spite of the numerical deficiency of the visiting staff in many parishes; and in spite of the ignorance of the people as to its objects; for they had to be instructed in the purpose and details of the measures introduced to save their lives while the pestilence was at their doors, and in many instances while it was already within their dwellings.

It has been shown that the total mortality from cholera for the whole of Great Britain, amounted to upwards of 60,000. The 15 towns above enumerated include, together with the metropolis, the largest cities in the kingdom, containing the densest masses of the population, crowded together in the closest and filthiest localities, in all of which at the time when the preventive measures were brought into operation the pestilence was raging: yet these masses, unquestionably the most predisposed and susceptible of the general population, contributed only about 4,250 to the 60,000 victims of the disease. Deep as may be the regret that the portion of the general population covered by efficient protective measures was thus limited, there is still consolation and encouragement for the future in the fact that in the most crowded localities in the largest cities, extensively and severely attacked by the pestilence, 130,000 infected persons were visited in the moment of their danger, themselves for the most part unconscious of that danger, and were placed in comparative security, having been sought out in their abodes and brought under prompt and appropriate treatment; the result being, the saving of suffering and life to a vast extent, and affording an instance, on a large scale, in which help was extended to those who were unable to help themselves.

That those who received this help in their time of need were duly sensible of its value, the following statements may suffice to show.

With reference to the metropolis, Mr. Liddle states,

that the four medical visitors of the Clerkenwell district report :—

“The poor almost universally regard the system of house-to-house visitation as a great boon. Mr. Ferguson says,—‘They have looked upon our staff as messengers of mercy, and welcomed us with many kind outpourings of grateful hearts; they felt that, though hitherto uncared for in their dire and dreadful calamity, at last the Board of Health has come forward as beneficent guardians of their health, and quieted alarm by efficient preventive measures.’”

Dr. M'Loughlin reports, that in Stepney the poor, seeing in a very brief period that the progress of the disease was arrested by the medical visitation, exclaimed, partly in reproach and partly in sorrow, “Ah! if this had been done sooner, our relatives, who are now in their graves, would have been alive.”

Dr. Lewis reports as follows of the feelings of the poor in the parishes and unions under his charge :—

“The medical house visitation was received with the greatest thankfulness. In the overcrowded districts the poor eagerly told the visitors their complaints, and received the medicines most gratefully. The instructions and advice were anxiously obeyed, and the visits were looked for in future. The people told me in several cases that they believed their lives were saved by being called upon by a medical man, while suffering from the weakness consequent upon the premonitory symptoms, instead of having to go to the surgeon, and finding then that he was attending another case. Two or three instances occurred within my own knowledge, of proposals being made by the poor for the purpose of presenting the visitors with some small testimonial, to mark their thankfulness for the benefits derived from their having been visited and comforted during a period of great affliction.”

Dr. Gavin says :—

“It seems to have given them a new confidence in the spirit of the institutions of their country, and to have inspired a feeling of regard for those above them which was quite unknown before. From my own personal inquiries I am satisfied it has done more to establish a bond of union in feeling between the neglected poor and the classes above them, than could have been aroused in any other way, or by any other means.”

Similar testimonies as to the gratitude evinced by the poor for the watchful inspection kept over them have been received from the provincial towns.

Mr. Lythgoe, one of the medical officers at Manchester, says:—

“I have had the most unbounded confidence and reliance shown me by the patients and their friends which may have tended in some degree to their security. My suggestions as to prophylactic measures in general, and the treatment of cholera, whenever practicable, have always been strictly and energetically carried out; in short, even among the most indigent, I have met with a ready acquiescence and obedience to any suggestions offered. I have much pleasure in stating that, with very few exceptions, the most grateful feeling has been evinced by the necessitous poor for the services rendered.”

Mr. Golland writes, that before the introduction of the visitation system in Manchester, “there was great alarm amongst the people, and a general feeling of irritation and distrust in the minds of the poorer classes, at the delay and difficulty experienced in procuring medical aid, which rendered them often apathetic and careless in applying for assistance;” but as soon as the new arrangements were in force, “the alarm almost entirely subsided.”

Dr. Cooper, medical superintendent at Hull, writes,—

“The unanimous testimony of the visitors is in favour of the high value which the poor set upon house-to-house visitation as a mark of attention to their welfare, and of their readiness to give information and assistance, and their thankfulness for the relief afforded.”

Dr. Duncan, of Liverpool, says, that the poor were “grateful with very few exceptions.”

Dr. Sutherland gives the following conclusions as the results under his observation of the visitation system:—

“That it has been proved by melancholy experience, that during severe epidemic seizures persons labouring under premonitory symptoms will not, of their own accord, apply sufficiently early for medical aid, and that therefore the great proportion of cholera cases are not seen at all till they are in the stage of collapse. To this circumstance is to be attributed the high mortality of the epidemic.

“That consequently the main dependence for arresting the ravages of the disease, and saving human life, must in future be placed neither in any specific mode of treatment nor in trusting to the application for relief of the patient or his friends, but chiefly on an active and systematic house-to-house visitation by medical officers specially appointed for the pur-

pose throughout all localities where the disease prevails, and the treatment on the spot of all persons found labouring under cholera or its premonitory symptoms.

“That there is ample evidence to show that the system of household visitation, adopted during the late epidemic, has been the means of saving a vast number of lives, both by preventing the development of cholera and by bringing many developed cases of the disease under successful treatment which otherwise would not have been seen until the stage of collapse, while it also led to the discovery and removal of many local causes of disease which would have escaped notice.”

Mr. Grainger, under whose superintendence the visitation in the metropolis was conducted, sums up his experience as follows:—

“In considering the various circumstances detailed in the preceding pages, the main and leading fact to be deduced from them is the extraordinary efficiency of house visitation in controlling the ravages of epidemic cholera. Whatever difference of opinion may arise as to the precise amount of this preventive influence, one thing is beyond dispute, namely, that as compared with all other modes of managing this terrific disease, medical visitation is incomparably the most successful. In all parts of London practitioners and medical officers became converts on observing the results; every individual who was engaged in carrying out the plan, whether as inspector or visitor, whatever may have been his previous opinions, has given his unqualified approval of the system. In various parts of the country the plan has been adopted, and everywhere the physicians and surgeons engaged in it have expressed their conviction of its entire efficiency. But if all other testimony were wanting, there is one which is of a nature that can be touched neither by friend nor foe; it is the witness of hundreds, perhaps we ought to say thousands, of the poor in every part of this metropolis, who have found in their own unlooked-for safety the proof that a remedy had been for them provided, for the want of which their relatives and friends had perished.

“Results of this important character would, under any circumstances, be sufficient to stamp this system as the one effective method; but it must not be forgotten that it was not put into operation until great efforts had been made, by the provision of extra medical aid, by the admirable devotion of the ordinary medical staff of the several unions and parishes, by placards and other means, to secure early and effectual aid to the suffering poor. A plan which, after such exertions as these had been in operation for several months, was so much more successful as to attract the general attention, and secure the approbation of all who witnessed its operation, must have had

within itself a principle of great excellence. There are, however, other considerations which suggest themselves in connexion with the house visitation. This great measure is the first general effort that has yet been made in the metropolis to investigate and rectify, by the direct agency of medical men, the sanitary evils afflicting the poor; and from the improvement which, in every instance, is reported by the visitors to have followed even the partial application of the appropriate means, some idea may be formed of the advantages and comfort which would be secured to the labouring population from their universal adoption.

“I cannot conclude this section of the present Report without offering my humble tribute of respect to what, among so many painful circumstances, is so gratifying as to the past, and so full of promise for the future—the admirable conduct of the people under the awful calamity with which it pleased Almighty God to visit this metropolis. In the midst of an amount of physical misery which no language can depict, and exposed to the ravages of a pestilence which within the limits of Europe, nay, within these kingdoms, have in this last epidemic created in the popular mind dark suspicions of the higher classes of society, and specially of those who know no other mission but to mitigate the bodily sufferings of mankind, the industrious poor of London have submissively borne their trials—so submissively, indeed, that no voice of complaint reached the public ear; though it is proved, by the unanimous testimony of a large body of medical men, that our humbler fellow-citizens are as acutely sensible to the manifold evils by which, in the filthy courts and alleys of the metropolis, their health is undermined, and their lives are sacrificed, as they are ready to tender their gratitude for any well-directed efforts designed for their relief.”

HOUSES OF REFUGE.—We regard the opening of houses of refuge in healthy and uninfected situations as an essential auxiliary to the system of visitation. We called attention to the importance of this measure in our Second Notification, when we stated that, as the proportion of attacks to the population had nowhere in this country been so large as to render it impracticable, or even difficult, to make provision for the temporary removal of such indigent persons as appeared to be in imminent danger; it was a subject deserving consideration whether, instead of the indiscriminate removal of the sick, it would not be more effectual, as well as less expensive, while provision is made for the proper treat-

ment of the sick, to take some care of those who, in all probability, will be the next victims of the disease, though the blow may not yet have actually fallen on them. As an extensive trial of this plan of removal had already been made in Edinburgh, during the prevalence of the pestilence in that city in 1832, with such success, that the authorities were anxious for its renewal; we authorized, with the advice of the Edinburgh College of Physicians, the re-adoption of this measure in Scotland, and deemed it our duty to confer, by our regulations, the requisite authority for carrying it into effect in England. Extended experience has afforded additional evidence of its great usefulness.

Dr. Sutherland states that, in the severe outbreaks of the pestilence witnessed by him in provincial towns, 87 per cent. of attacks took place in houses where more than one person had suffered from the disease; and that when the attacks thus occurred in groups in the same or adjoining houses, the danger to the inhabitants was enormously increased by leaving them in their dwellings; while very few attacks, and scarcely any deaths, took place among these people, if they were removed from the infected locality to houses prepared for their reception, and were kept there in comfort and under observation until their own localities and rooms were cleansed. Thus, in the late experience of the epidemic, out of 270 inmates of the House of Refuge re-opened in Edinburgh, no case of cholera occurred. Out of 807 inmates in two Houses of Refuge opened in Glasgow, there occurred 25 cases of cholera, and eight deaths. In Dundee, out of 250 inmates, there were four attacks, but no death. In Sheffield, out of 145 inmates, there were four attacks, and two deaths. In Bristol, out of 210 inmates, there was no case of cholera, and no death. The following illustration of the utility of the Houses of Refuge, is given by Mr. Goldney, of Bristol:—

“ In a certain lodging-house in Bristol, there were 35 attacks of cholera, and 33 deaths, during the epidemic of 1832. There was then no house of refuge in existence. During the late epidemic a case of cholera occurred in the same house, and I went, and by the aid of the police, turned out of it 64 people, 49 of whom were sent to the House of Refuge. Out of that

number not a single case of cholera took place, but there was a good deal of diarrhœa, which was immediately arrested."

A similar illustration of the beneficial results of dispersion is given by Dr. Milroy.

"Cholera broke out in the month of July, in the Clock-house at Peckham, containing at the time between 50 and 60 inmates. Eleven were seized with the malignant disease. All the unattacked were instantly dispersed, and the sick alone were allowed to remain. Of the 45 who were thus removed from the focus of infection, 25 were affected with diarrhœa at the time; but not in a single one of these cases did the diarrhœa pass into cholera."

The inmates of Houses of Refuge were all taken from houses in which cholera was actually prevailing, the very foci of the epidemic, or from the immediate vicinity of such houses, and it is certain that most of them had imbibed the poison before their removal, for they were either labouring under diarrhœa when admitted, or cholera developed itself soon afterwards; yet, taking together the whole of the Houses of Refuge in the towns just enumerated, it appears that out of 1691 inmates, there occurred only 33 attacks, and 10 deaths.

The value of this result will be appreciated when it is considered that the general mortality from the epidemic, has varied from 1 per cent. to 3, 4, and even 7 per cent on the entire population of towns, including not merely the infected localities, but also the unaffected population; and yet, among the inmates of the Houses of Refuge, who must be regarded as consisting of the most susceptible subjects, the proportion of deaths was less than 0·6 per cent.

"It is very much to be regretted," (says Dr. Sutherland,) "that this system was so inefficiently carried out in many of the affected parishes. I found almost everywhere a want of intelligence in appreciating its importance; and I hardly know an instance, except in a few of the Scotch towns, in which a House of Refuge was prepared before the disease made its appearance. Even after hundreds of persons had died, I have occasionally experienced great difficulty in inducing Boards of Guardians to provide the needful accommodation. This has arisen partly from the obstacles which popular prejudice has thrown in the way of obtaining suitable premises,—one of the necessary fruits of the doctrine of contagion,—and partly from

the fear that pauperism might be increased. The marked beneficial results which have been observed wherever a House of Refuge has been properly worked, warrant me in stating that a great many lives have been sacrificed all over the country from want of attention to the orders and notifications of the General Board of Health, in regard to this matter."

With reference to the metropolis, Mr. Grainger states—

"It is one of the best established facts that in the management of cholera there is not, next to prompt medical aid, any measure susceptible of immediate application so effectual as the removal of those who are yet well, but threatened with the pestilence, out of the crowded and miserable abodes usually selected for attacks of the epidemic. There was therefore no provision more urgently demanded for controlling the force of the epidemic than houses of refuge; and yet I do not recall more than two or three instances in which any such places were opened by the authorities. I am again not unmindful of the difficulties which were met with in this respect, for there is no doubt that the objections which applied to the letting of premises for cholera hospitals, also operated, though in a much less degree, as regarded a house of refuge. The testimony of the medical officers was uniform as to the enormous evils that resulted from the impossibility they experienced of removing families living in single rooms when one or more of their members were attacked. In every part of the metropolis these instances were constantly recurring; members of the same family were again and again attacked in succession, as many as three, four, five, and six persons, succumbing one after another in the same house; in fact, the mortality tables in many localities were swollen by such catastrophes as these."

In towns and villages in which no suitable premises for houses of refuge were to be obtained, we recommended the erection of a temporary building in some open and healthy situation to which individuals might be removed until their own dwellings could be purified. In cases of extreme emergency we applied, in a few instances, to the Board of Ordnance for a supply of tents for the temporary accommodation of the population in places where no preparation had been made for the visitation of the pestilence, and where it was impossible, in the height of the epidemic seizure, to obtain suitable buildings for houses of refuge. Our request was readily acceded to, with the effect, in several instances, of rapidly arresting the progress of the disease.

This was the case at the town of Mevagissey, in Cornwall, for example, consisting of about 400 houses; this town lies in a valley, bounded by two cliffs of considerable altitude, the streets being tortuous and irregular, and the houses generally so arranged that any thorough draft or proper ventilation is impossible. The houses in general are small, dirty, imperfectly supplied with light, over-crowded, and wholly unprovided with sewers or drains to carry off refuse. Out of a population of 2,100 inhabitants, 136 persons died of cholera. Mr. Bowie, jun., visited the town when the epidemic was at its height, and finding it impossible properly to cleanse and ventilate the place, he resolved on removing as many of the people as practicable to some healthy spot in the neighbourhood. He formed an encampment at Port Mellon, a distance of about half a mile from Mevagissey; here he erected tents, and fitted up lofts, taking care to prevent overcrowding, and succeeded in persuading 1,300 persons to leave the town, of whom 452 took up their temporary residence in this encampment. There happened to be on this spot an abundant supply of excellent water, celebrated for its purity. The persons located at Port Mellon were taken from the parts of the town where cholera was the most prevalent, yet out of the whole number (452) not a single case of cholera occurred, while of those who persisted in remaining in Mevagissey, scarcely one escaped an attack of the disease.

Dr. Milroy, who visited Mevagissey at the beginning of the epidemic, strongly urged on the local authorities the absolute necessity for removing the people, as the only means of saving them from death. But no efficient steps were taken, until we deemed it necessary to enforce observance to our directions. The deaths from cholera had amounted to three times the average annual mortality of the town before the epidemic was arrested, and adverting to this fact, and the subsequent results of the dispersion of the people, Dr. Milroy says—

“There cannot be a reasonable doubt, that had the dispersion of the people been effected at the beginning of the visitation, comparatively few lives would have been lost.”

Tents were also extensively used with great advantage

in the Wolverhampton Union. The medical superintendent of the Union thus reports of them—

“Being in possession of the requisite information daily, I was enabled with great effect to remove to the tents large masses of the people, *i.e.* from Wolverhampton, in some cases as many as 40 at a time, who on the removal of the nuisances and purification of their dwellings were restored to their homes. The tents were found to be admirably adapted to provide shelter, and during every variety of weather afforded ample protection, the health of the people being not only preserved, but improved in a marked degree. I have to express my regret that similar advantages were not afforded to Bilston and Willenhall, where, although tents were provided, local Boards of Health discovered disinclination to supply that accessory accommodation which was essential.”

“I have mentioned the case of two parishes,” (says Dr. Sutherland,) “in which the great remedy required to save the people was their removal from affected houses. In this case tents were sent for their relief, but the local committees would not put the necessary bedding into them. The people consequently would not use them and died.”

Dispensaries were found to be highly useful when forming a part of the system of visitation; but much sacrifice of life followed whenever they were relied on alone or principally.

CHOLERA HOSPITALS COMPARED WITH HOME-TREATMENT.—From the experience of Great Britain and other countries in 1831-32, we came to the conclusion that the treatment of cholera patients in hospitals was not successful, and we discountenanced the use of these establishments, recommending that the best provision practicable should be made for affording assistance to the individuals who might need it at their own homes, particularly by the selection of proper persons instructed as nurses in the special services required on the occasion, and paid for devoting their whole time to attendance on the sick at their own habitations, under the direction of the medical officers.

The experience of the late epidemic has placed the correctness of this view beyond doubt.

“The results of the treatment of cases of cholera in hospitals,” (says Dr. Sutherland,) “as compared with those of home-treatment, have fully borne out the statement made in the first notification of the General Board of Health, in regard to the

experience of the former epidemic, namely, that 'the establishment of cholera hospitals was not successful.' When we consider the wretched, over-crowded dwellings occupied by a great proportion of the parochial cholera patients, and the apparent impossibility of bestowing on them that amount of medical care and assiduous nursing which they so much require; and when we contrast with this the great apparent advantages possessed in hospitals for the treatment of so virulent a disease, we should naturally expect the balance of recoveries to be in favour of the latter. The parochial surgeons had in general every disadvantage to contend with in the home-treatment of cholera, while the patients in hospital were watched over with unremitting care, by night and by day, and every appliance of the healing art brought to bear on their cases. I believe that nothing was left untried which afforded the patients a chance of recovery, and yet the statistical results of the two modes of treatment preponderate greatly in favour of leaving the patient at home."

The illustrations selected as an example of the evidence received on this point, are the returns from three cholera hospitals in Glasgow and four in Liverpool, from which it appears that out of 5,168 cases treated at home, the deaths were 1,909, or 36·9 per cent, while out of 2,040 cases treated in hospital, the deaths were no less than 1,099, or 53·8 per cent., making a difference of 16·9 per cent. in favour of home-treatment, which, on the whole number of hospital cases, would amount to the saving of about 345 lives.

The fatigue consequent on removal appears to have been alone sufficient to make this great difference in the comparative mortality of the disease.

"Many of the fatal cases," (continues Dr. Sutherland,) "were transferred to hospital in an early stage of the disease; and it was a general instruction to all parochial surgeons, on no account to direct the removal of a case to hospital which was at all approximating to the stage of collapse. I have known a patient taken out of bed with a warm skin and a good pulse arrive in a state of fatal collapse at the hospital, though not above a quarter of a mile distant. The effect of distance has even been made the subject of statistical inquiry; and although the number of cases which have been examined into is not, perhaps, large enough to obviate error, yet the results are so very striking as to be worthy of notice. At the Woodside cholera-hospital, Glasgow, it was found that, out of 32 cases brought from the immediate neighbourhood, the deaths were in the ratio of

37½ per cent., whilst out of 64 cases, brought from more distant localities, the deaths were about 47 per cent."

Dr. Duncan, of Liverpool, has made a similar observation as to the effect of distance in increasing the mortality of the disease. He found that the statistics of three cholera hospitals, two of which were in infected districts, and the third at some distance from them, showed a mortality of 7·3 per cent. in favour of the hospitals nearest to the dwellings of the patients who had to be transferred to them. The experience of Glasgow, which is worthy of being recorded, because the question received there the consideration of a large and intelligent staff of medical officers, is thus stated by Dr. J. M. Adams:—

"Almost from the instant of an attack a cholera patient may be considered as engaged in a death struggle. To be raised in his dying condition, carried along crooked stairs and narrow passages to a cholera van, to be then rattled and jolted for a distance of a half-mile or upwards, followed by a second transference to the hospital ward, cannot be considered an unimportant process by any medical man who has witnessed the disease. I set aside any consideration of the probable effect on the mind of a patient, as I have observed that in cholera the patient is singularly apathetic, presenting in this respect a contrast to a fever patient. At first, when I had all my experience to gain with regard to the treatment of cholera, I was favourably disposed to the employment of hospitals, and looked with painful apprehension to the treatment available to the sick poor residing in dwellings abounding in negations, *sans* food, fire, bedding, clothing, light, air, quiet, attendance, &c. I am now, however, clearly satisfied that a pauper patient lying on his wisp of straw, on the bare floor, with a relative or other attendant to supply him with a drink of cold water, and to surround him with a few hot bricks, has the chance of recovery farfully diminished by removing him to all the comforts and refined treatment of an hospital. If my experience on the subject were singular, I would hesitate to venture so decided an opinion; but from careful inquiry which I have made among any of the parochial surgeons, I find their experience so entirely corroborative that I feel justified in condemning the principle of hospital treatment for cholera patients."

Contemplating, however, the probability of the occurrence of cases of extreme destitution in neighbourhoods and houses wholly unfit for the curative treatment of the

sick, we recommended that separate apartments specially prepared for the purpose, and properly warmed and ventilated, should be provided for the reception of such cases.

“The accommodation which will perhaps always be required during cholera epidemics,” (says Dr. Sutherland,) “should consist of scattered rooms, as near the affected houses of the worst districts as possible. So thoroughly am I convinced of this, that were it impossible to find suitable rooms near enough to the worst districts of the worst towns, I should make the home-treatment of cholera the only alternative by providing no hospital accommodation whatever, and remove the convalescents, as soon as it could safely be done, to proper wards, in an airy, healthy locality.”

Mr. Grainger states that great difficulties were experienced by the Guardians of the Poor in their endeavours to procure suitable accommodation of this kind in the metropolis.

“In Lambeth, for instance, I know that repeated efforts of the kind were made by the authorities, but unavailing; in other cases, on the contrary, I feel assured that by proper exertions this important desideratum might have been secured. There was during the prevalence of cholera another serious defect, which, there can be no doubt, might, by ordinary care, have been entirely obviated; I allude to the great want of nurses, both as regarded number and qualification. On this point I received repeated complaints from the medical officers; and yet, considering the absence of hospital accommodation, which prevented the removal of the sick when desirable, and the want of all the articles required to minister relief to the sufferers in the miserable dwellings of the poor, nothing would have conduced so much to second the efforts of the medical attendants as a staff of respectable and trustworthy nurses provided with the necessary requirements. In most parishes some few nurses, it is true, were supplied; but they were usually insufficient in number, and being for the most part paupers, were often not qualified for their office. Repeated instances of misconduct were mentioned to me, again causing regret that a parsimonious economy was allowed to interfere with the mitigation of suffering in its most awful and afflictive form.”

EARLY REMOVAL OF THE DEAD. — The Legislature having in the statute directed special attention to the need of regulations for the early removal and proper interment of the corpse, we issued to medical officers a general order authorizing and requiring them, in the

event of the fatal termination of any case of cholera, in any room occupied as a living or sleeping-room by one family or more, or by numerous persons, to cause to be removed as speedily as may be, either the corpse or the persons occupying such rooms, until the corpse could be conveniently removed and properly interred.

On a review of the evidence, showing in what manner and to what extent these regulations were carried into effect, Dr. Sutherland reports :—

“Generally the people appear to have been aware of the necessity of interring the body as early as possible ; but in a considerable number of cases, either from ignorance or indisposition, there has been a tendency to delay. In such instances the regulations of the Board have come into beneficial operation, but rather by a moral than by a legal agency.”

Many statements are cited (Appendix A., page 130), from medical officers to the effect that their expostulation, supported, as the people knew it to be, by the power conferred by the regulations, were in most instances sufficient to effect the object, and that in the few exceptional instances in which it was necessary to call in the assistance of the police, the people consented to what was required without opposition. On this subject, and on the necessity for some further provision for the establishment of intermediate reception houses, Dr. Sutherland reports :—

“The evidence shows that the power has been exercised with much discrimination, judgment, and humanity ; and that its exercise has been highly beneficial. The regulation has in fact worked extremely well, and has affected all that could have been contemplated from it, but nevertheless some further provision for the early removal of the dead appears absolutely necessary.

“Every one conversant with the dwellings and habits of the poorer classes in England must be aware that overcrowding exists to a great extent in all our large towns, and they must frequently have observed the strange intermixture of the dead with the living which this circumstance at present necessitates. During epidemics, as for example the recent outbreak of cholera, the necessity for some place for receiving the dead previous to interment must have pressed itself on every one who was really conversant with the state of the poor during that terrible visitation.

“I have received a great deal of evidence on this subject from

medical men in all parts of England and Scotland, a few specimens of which I subjoin. The retention of the dead in rooms occupied as living or sleeping rooms is necessarily almost universal among the poor. During the late epidemic, however, it very frequently happened that two or more corpses were laid out in the room at the same time. I have seen three adult corpses in one room, and a person ill with cholera in the only other room in the house. On another occasion, on a hot summer's day, I saw two corpses in a small apartment in which there were three persons sitting. There was a fire at the same time in the room. Dr. Duncan, of Liverpool, states that he has met with 15 instances of two corpses in the house at the same time. Mr. Trahan, one of the Union officers at Liverpool, mentions 24 such instances. Mr. Cooper, medical officer to Wolverhampton Union, says that he has had 18 or 19 such cases; and similar information has been derived from many localities. Corpses of persons who have died from typhus, scarlet fever, and other epidemics, are also retained for a period beyond what is safe, if, indeed, any retention be safe in such cases. The practice in many districts appears to be to keep such corpses three, four, or five days. Mr. Pearse and Dr. Tripe, of Plymouth, state that they 'have seen much evil and delay in cases of death from typhus and epidemics,' from the undue retention of the corpse. Mr. Kimpton, surgeon, says, 'I have known corpses of persons who died of typhus and scarlatina kept several days in rooms with the living, and believe in some instances it was the cause of disease extending to other persons in the house.' Dr. Duncan, of Dundee, writes, that interments of persons who have died of epidemic disease are 'in general delayed too long amongst the poorer classes.' Dr. Roe, of Plymouth, says, 'I have seen the coffin lying on the bedstead in one part of the room, the food cooking in another. and the dressmaker making mourning in a third. . . . I have never known an interment hurried in the slightest degree because the person died of typhus or other epidemic—not even when there was only one room for the living and the dead.' Mr. White, surgeon, Dowlais, writes, 'It is a very common event to see a large party of relatives sitting around a table partaking of food, and a corpse lying in one corner of the room.'

"It is in vain to look for any alteration in this state of things until proper accommodation for the dead be provided. The difficulty must be obvious, and it has struck many careful observers. Mr. Stott, surgeon, Manchester, says, 'I know no instance in which the removal of a corpse from a dwelling-house preparatory to interment took place; *no place that I am aware of having been provided for such purpose.* The withdrawal of the living from the dead would be *most difficult* in the ma-

majority of instances. A receptacle for the dead appears a desideratum, and I think would be well received by the people themselves.' Mr. West, surgeon, Hull, writes, 'I have known the corpses of persons who have died of typhus, scarlatina, measles, and smallpox, retained in the dwellings of the poor for a much longer period than I considered safe;' and he adds, 'there should be immediately provided some places in convenient localities where the poor might deposit their dead under proper regulations, having due regard to their feelings; and although objections would be raised at first, they would soon give way to the urgent persuasion of the persons who would be placed in charge of such depositories.'

"Mr. Pearse and Dr. Tripe also point out the importance of providing reception-houses. They say, 'We would beg respectfully to suggest the propriety, during the prevalence of malignant diseases, of buildings being provided for the immediate reception of the dead, especially for the working classes, who, in large towns, are generally compelled to live in single, confined, badly-ventilated and badly-lighted apartments.' Other medical practitioners make similar suggestions. Even the poor themselves have felt the evils of being compelled to retain their dead, and have been obliged to resort to precipitate interment. A number of such instances are given by the parochial medical officers in all parts of the country. They chiefly take place in cases where death has occurred in the lower class of lodging-houses, in order that 'the room may be occupied again.' In some cases no medical aid appears to have been sent for. Mr. Cripps, surgeon, Liverpool, says, 'I have often been called up during the night in order to give a certificate of death, for the purpose of having the corpse interred the first thing in the morning, the person having only died in the early part of the night.' Dr. Duncan, of Liverpool, bears important testimony to the desire for getting rid of the dead in some cases. He says, 'During the recent epidemic, from 30 to 40 applications were made to me to procure the removal of bodies, retained for a period longer than I judged safe.'

"This obvious necessity led to the actual opening of a reception-house at Leeds during the late outbreak of cholera. Mr. Radcliffe, surgeon to the Union, states that, on the first appearance of cholera in Leeds, the Board of Guardians, at his request, erected such a house in connexion with one of the cholera hospitals; 'and to this place,' he says, 'I caused to be conveyed many bodies from *single* and other rooms previous to interment—indeed, almost immediately after death; and when the poor found that the dead were treated with decency and respect, I found no opposition to their being sent there.'

"Here, then, was a very natural solution, and at the same

time a successful one, for a great difficulty arising from the overcrowded state of our cities and towns. Perhaps no clearer proof of the existence of the evil could be given, and no more satisfactory method of getting rid of it indicated, than the preceding evidence affords."

The question of the expense of epidemics as connected with parochial rates, has hitherto not attracted the attention which its importance deserves. We have experienced considerable difficulty in obtaining correct returns of the number of widows, widowers, and orphans who have been left permanently chargeable on the several unions throughout the country on account of death from cholera. Up to the present time only a small proportion of the unions have made returns. From those, however, which have been received we have selected twelve (Table A.) as illustrative of the amount of the cost to which the ratepayers have been put.

It is estimated that the average cost for the maintenance of an adult is 4s., and of a child 3s. per week, amounting severally to 10*l.* 8s. and 7*l.* 16s. per annum.

Taking for example the parish of Lambeth, it will be seen that there were 81 cholera widows and widowers, and 234 cholera orphans thrown upon the parish for support at an annual cost of 2,667*l.* 12s. But this expense cannot be considered as terminating at the end of one year, since some of the children may have to be maintained for 10 or 12 years; and a considerable portion of the adults may continue chargeable to the parish for several years. Assuming, therefore, 4 years as the average period for which support must in each case be provided, which will scarcely be regarded as a high estimate, the cost to the ratepayers of Lambeth for cholera widowhood and orphanage alone would amount to 10,667*l.* In Leeds it would amount to 25,251*l.* 4s.; in Portsea to 9,380*l.* 16s.; and in the whole of the twelve places selected, the total cost would amount to 121,576*l.*

If the whole of the unions throughout the country had made returns; and if all these returns had been subjected to a similar calculation, it would have been seen that the epidemic disease tax is not the least for-

midable of the taxes which must, in the existing state of things, be borne.

Before concluding this Report we deem it our duty to represent the result of our experience of the working of the "Nuisances Removal and Diseases Prevention Act," with its existing machinery. It is a matter of deep regret to us that, during the entire prevalence of the epidemic we have, in many instances, been wholly unable to carry into effect the beneficent intentions of the Legislature, in consequence of the inappropriate and inadequate machinery provided by the Act for its local administration, and this regret is increased by a consideration of the extent to which suffering and loss of life have been prevented in the towns in which we have succeeded in inducing the local authorities to exercise in an efficient manner the powers intrusted to them for the prevention of disease.

The following considerations may suffice to illustrate the chief defects of the machinery at present appointed for the administration of the law.

The object of the Nuisances Removal and Diseases Prevention Act is to make provision for the protection of the public health and life on the breaking out of epidemic and contagious diseases, and especially such as are peculiarly formidable in their nature and likely to spread extensively. It is a special provision applicable not merely to one class but to all classes; for though in a season of pestilence some classes may be in greater danger than others yet none are exempt. The speciality of the case requires special knowledge and fitness in those who are to take the practical steps for fulfilling the intentions of the Legislature.

The Diseases Prevention Act contemplated the Poor Law Boards generally as the most eligible local administrative bodies for the execution of its provisions. With the aid of the staff of medical officers, and with the fever wards of the Union houses as provided in England and Wales, there can be no doubt that they are far more eligible bodies than the common parochial bodies, which were the only ones available in 1832. In the rural districts there are no other bodies now eligible; if it were absolutely requisite to have recourse to an existing

body, and not to provide a special one for the extraordinary emergency.

The obstructions to the execution of remedial measures by the Boards of Guardians arose generally from the following circumstances:—

The provision intended by the Legislature was one for the common protection against impending dangers, as has been stated to *all* classes, against which the individual means of private persons were inadequate.

But the common functions of the Poor-law Guardians relate exclusively to one class, the destitute or the pauper class only. Notwithstanding the scope of the Act, and explanatory notifications, the first and common impression of the guardians of the poor was, to confine the measures of prevention to the destitute, and administer it according to their settled practice, as respects the relief of paupers, which is to do nothing except on application, and then only upon proof given of the urgency of the case. Acting on this impression, they, with few exceptions, treated the whole preventive measures as common medical relief, which they would not allow to be given, without a previous order obtained upon inquiry and adjudication into the circumstances.

Mr. Grainger, in reporting on the system of medical relief adopted, says :—

“ The most serious, or rather, as it ought from its results to be called, the most fatal mistake which pervaded the whole of these remedial measures, from first to last, was this:—the guardians—herein departing diametrically from the injunction of the General Board, that cases should be sought out—in all their arrangements acted upon the principle that the poor, when attacked, should apply to the medical officer, who thus, instead of discovering cases in their first incipient stage, waited for an application—a delay which led, as I am prepared to show, to the most fatal consequences. The evidence collected from all parts of the metropolis points but to one conclusion: the patients who suffered from cholera, and who were treated under the system of the guardians, were in the great majority of cases, seen for the first time by the medical officers when in complete or incipient collapse; when consequently the aid of medicine was almost as nothing; when, whatever mode of treatment was adopted, from 40 to 50 per cent. of those attacked would perish. So generally, or rather universally, was this the

case, that on reflection I cannot recall the instance of a single parish or union in London where, so far as the proceedings of the local authorities were concerned, apart from the Board of Health, any plan was adopted for seeking out persons affected with the premonitory, first, and curable stage of cholera. That partial steps were taken—that the medical officers overtaxed their powers in the effort to supply assistance to the multitudinous sufferers—that they again and again visited the afflicted localities, is true; but, large as were the numbers relieved by their meritorious exertions, still larger numbers were overlooked, many of whom subsequently fell into collapse, and swelled the weekly tables of mortality.”

There may be no question of the general soundness of the rules adopted by the Guardians, as rules for the relief of mere pauperism, nor that it would be repugnant to the parochial authorities to go round from house to house in search of objects of pauper relief; but it is equally clear that these rules are repugnant to a measure intended to provide, not relief to paupers, but protection and warning to all classes against a common danger, the real form and force of which the people had usually no means of appreciating and guarding against individually, at all events, in time.

The independent classes had extensively a natural mistrust of the approaches or services tendered by the agency for the relief of paupers.

The persons serving in the office of Guardians could scarcely be expected to take steps upon wide estimates of remote contingencies such as might be the basis of insurances, as required by all measures of prevention, or to act upon any other than measures of immediate and manifest danger, even where their time and attention were not pre-occupied.

In particular rural districts it was reported to us that there was much done in the removal of gross and palpable nuisances: but in some districts visited by our inspectors, even these operations were frequently found to be carried into effect in such a manner as to aggravate the evil; such as cleansing ditches without regard to time or method, by spreading the mud on the banks and increasing the extent of evaporating surface. In the towns, however, the Boards of Guardians were preoccupied by

their existing duties; and were reluctant to undertake new and extraordinary duties. The effect of this reluctance, notwithstanding distinct warnings and particular instructions and exhortations, are displayed in the Reports, dated 19th January, 1848, of Dr. Farre, Mr. R. Martin, and Mr. Toynbee, sent round to examine the fitness of the Union-houses in the metropolis for the reception of cholera cases; and the Report of Dr. Farre and Mr. Grainger, dated 26th March, 1849, on the second examination of the same places to ascertain how far the first recommendations had been acted upon.

The existing Act not only regarding the guardians of the poor as the executive body, but at the same time naming several other local authorities such as the town-council, trustees, or commissioners for draining, paving, lighting, and cleansing, and also commissioners of sewers, has created a divided power, and consequently a divided responsibility, which, during the late epidemic, has led to much neglect and delay and consequent loss of life.

Mr. Grainger reports, as an instance of the evils arising from this divided responsibility, a case in connexion with a coroner's inquest, held on the body of a person who had died from cholera. The place where the person had lived was in a most filthy condition, with overflowing privies and obstructed drains, and had, indeed, attracted considerable attention; one of the medical officers had reported that it was ill paved, ill drained, and likely to be productive of disease. This Report was presented to the Board of Guardians before the attack of cholera occurred, and was by them referred to the Commissioners of Paving, which led to considerable delay, and in the interval the person was attacked and died.

Another cause of delay throughout the epidemic arose out of the intermittent meetings of the Boards of Guardians, which were usually held only once a week; till towards the close of the epidemic no arrangement was made to secure more prompt action, and from this cause alone, a considerable sacrifice of life ensued.

It has been represented to us that the Boards of Guardians themselves have frequently expressed an opinion that they are not proper authorities for the exe-

by the Guardians of the Poor.
cution of the Nuisances Removal and Diseases Prevention Act; their duties as guardians being scarcely compatible with those of an effectual administration of measures for the prevention of disease. Dr. Gavin states that —

“ At an interview with the Board of Guardians of Bethnal-green, the chairman of the Board, who is a magistrate, expressed himself to the effect, that they were quite sick of having charge of the medical arrangements for the relief of the poor, and that they would be heartily glad to get rid of it. This statement was made deliberately, and appeared to be the unanimous feeling of the Board. Though expressed in consequence of the feeling of responsibility, arising from the charge of the extraordinary arrangements imposed upon the Board by the prevalence of cholera, yet I know the opinion is the same with reference to the ordinary superintendence of medical relief. Universally, the clerks of the guardians, with whom I was in official communication during the recent prevalence of the epidemic, complained of the hardship inflicted on the guardians by the Act which imposed on them the responsibility of carrying into effect the arrangements for the prevention of disease. They contended very earnestly, that the administration of the law for the relief of the poor had nothing whatever to do with the arrangements for the prevention of disease; and that the Boards of Guardians were not the parties fitted to undertake such onerous and responsible duties. They uniformly declared their conviction, that their ordinary duties under the Poor Law were such as to prevent their fulfilling the extraordinary duties imposed upon them by the Nuisances Removal and Diseases Prevention Act; and that though such duties might be imposed, it would be impracticable to carry them out with any efficiency.”

Dr. Sutherland thus concludes his account of the manner in which, on the late trying occasion, the local authorities, under his observation, have executed the duties imposed upon them :—

“ I have endeavoured to do justice to those parishes which willingly carried out the preventive measures of their own accord; and I have shown that a great deal of human life was saved in all the towns by directing the local measures until they were in full operation. I must not be considered therefore as in the slightest degree undervaluing the importance of the great work which has been accomplished. It is possible also that many epidemic attacks may have been prevented by the preparatory measures of Boards of Guardians in parts of

the country which did not come within the sphere of my own observation; but I should fail in my public duty if I did not express my decided conviction that many lives were lost which might have been saved, and that this calamity arose out of the very nature of the machinery employed."

Adopting a large remedial interpretation of the authority given under the Act "for taking measures of promptitude, according to the exigency of the case, by such directions and regulations as the said Board shall think fit for the prevention, as far as possible, or mitigation of such epidemic disease," we were prepared to issue directions to special local bodies for the execution of the measures of prevention; but we were debarred from that course by the opinion of the law officers, that the general words of the statute could not be so construed as to warrant such a combination of the local authorities as we proposed for the purpose.

A review of the general experience now adduced as to the peculiar nature of preventive measures, and as to the constitution of local bodies, will suggest one conclusion, that the only chance of executing such measures promptly and efficiently, will be by new and special local and general administrative arrangements, the particulars of which we may have a fair opportunity of submitting for consideration, as part of the amendments which may be required for the execution of the Public Health Act.

In conclusion we would call attention to the unanimous testimony borne by all classes to the exemplary manner in which the medical officers of the parishes and Unions, and the medical visitors specially appointed for this service, have performed their difficult and dangerous duties. Our own Superintending Medical Inspectors have had the best opportunities of forming a judgment on this subject. With reference to the medical service of the metropolis, Mr. Grainger says:—

"At a time when all who were able quitted even the healthiest parts of London, the medical officers, often debilitated by their incessant labours, and even suffering under unmistakeable symptoms of the disease, never quitted their post, though that was of necessity in the very focus of the pestilence. Many among their number were, after the exhausting fatigues of the day, disturbed in their rest at night for

weeks and weeks together: one surgeon did not change his clothes for eight or nine days, sleeping at intervals on a sofa; another for 18 days had not two hours' consecutive sleep; and all these great services, it should be recollected were, for the most part, performed amidst the obscurity of dark alleys and pestilential dwellings, unseen by the public eye, frequently undervalued, even where known, and always miserably underpaid. Examples are not wanting of surgeons who, after a year of such labours and such services, have received for their recompence actually less than would defray the additional outlay caused by the enormous amount of expensive medicines, and by the provision of an extra assistant. In other instances no extra remuneration whatever was granted."

Dr. Sutherland reports:—

"I would bear the strongest testimony to the self-denying zeal and ability with which the medical officers so nobly discharged the highly responsible duties confided to them during a great public emergency.

"The question of remuneration for services rendered by medical officers, though not coming under the regulations, nevertheless arises out of the recommendation of the Board that they should be liberally dealt with on account of the heavy additional duties thrown on them. I know a number of instances in which a suitable payment has certainly been made; but the complaints of the miserable remuneration afforded have been so numerous, that I question very much whether it would be wise to encounter another epidemic such as the last, without other arrangements. I feel satisfied that in the majority of instances which have come under my own observation, nothing but the dictates of humanity would induce the medical officers to undertake the work anew, with the chances of being similarly paid for it."

Though the late extended experience has shed no light on the primary or proximate cause of this pestilence; though that remains involved in the same impenetrable mystery as ever; and though little has been added to our knowledge of any effectual mode of treatment in the developed or collapsed stage of the malady, yet we apprehend that a consideration of the various matters of evidence which have been now adduced, will show that recent observation has elicited truths of the highest practicable importance to the people of this country and of other nations.

On a review of the whole of the late experience, we con-

ceive that its main results are in strict accordance with the conclusions at which the Metropolitan Sanitary Commissioners arrived from their official investigations in 1847. Before the second visitation of the pestilence had yet returned, but when the calamity appeared to be impending, from a consideration of the rise and spread of cholera in 1831, and a comparison of the circumstances which marked the severity and extent of its prevalence in the principal towns, both of Great Britain and of Europe, the Commissioners arrived at the conclusion, contrary to the view which was then commonly entertained, that the pestilence would present nothing peculiar in its course; but that it would be found to be governed by the same laws as other epidemics, and to attack in the largest numbers, and with most severity, the same classes of persons and the same places as typhus, scarlet fever, diarrhoea, and the entire class of zymotic diseases. We submit that the history of the pestilence which we have now given, relative to the persons and places that have suffered as well as to those that have been exempt, has placed this matter beyond further question.

On a consideration of the evidence which was at that time submitted to the Commissioners that the conditions which favour the origin and spread of typhus, and the other common epidemics of this country, particularly overcrowding, which year by year has gone on steadily increasing, by the increase of the population as well as by immigration, without a proportionate provision of proper habitations, or any additional means for the removal of the increased filth, necessarily consequent on augmented numbers; the congregation of great numbers of the population in all our large towns into compact masses, without fresh air and without pure water; living, many of them, over cesspools, or close on foul and overflowing privies—considering that these and other circumstances conducive to an impure condition of the atmosphere had not diminished since the former epidemic, but had materially increased, the Commissioners expressed an apprehension that the approaching epidemic would be more extensive and fatal than that of 1831. Instructed as we now are by experience as to the extent to

which this apprehension has been realized, it is matter of regret that this apprehension was not at the time more forcibly urged on the attention of the legislature. It has been already stated that the deaths in the recent have been more numerous than the recorded attacks in the former epidemic, while the attacks have been more than double : the total number of recorded deaths in England and Wales in the whole of the former epidemic being only 16,437, whereas in the single year of 1849 they amounted, including diarrhœa, to 72,180.

The terror with which the re-appearance of this disease was universally regarded at the time when its second return was expected, arose principally from the prevalent opinion that it was a sudden and uncontrollable malady, neither to be prevented nor remedied. In our First and Second Notifications, we made representations which appeared to us to be calculated to remove this false and pernicious popular impression, and by a large body of evidence derived from the experience of [the disease in India, and in the principal towns of Europe, as well as from the experience of our own country in 1832; we endeavoured to show that, with a few exceptional cases, occurring chiefly at the first outbreak of the pestilence in a new locality, the disease gives distinct warning of its approach, in time for effectual precautions to be taken against it; and that if that time is not lost, and proper precautions are not neglected, in the immense majority of instances, the malady may be stopped in its first or premonitory stage, and its progress to a fatal termination arrested. We submit that the truth of this view, which was at that time doubted even by the highest medical authorities of this country, is established by the entire body of evidence which has been detailed in the preceding pages.

It was stated in the Metropolitan Sanitary Report, that when cholera first appeared in this country, the general belief was, that the disease spreads principally, if not entirely, by communication of the infected with the healthy, and that therefore the main security of nations, cities, and individuals, consists in the isolation of the infected from the uninfected,—a doctrine which naturally

led to the enforcement of rigorous quarantine regulations; the establishment of military and police cordons; the excitement of panic; and the neglect, and often the abandonment of the sick, even by relations and friends: but that since opportunities had been obtained of a closer observation of the character of this disease, and of the mode in which it spreads through continents, nations, cities, towns, and families, facts had been ascertained which were incompatible with this view of its mode of dissemination, and of its prevention; that the disease is not in the common acceptation of the term contagious, but spreads by an atmospheric influence, its progress consisting of a succession of local outbreaks. We submit that the facts which we have now detailed relative to its progress from Asia to Europe, through the several countries of Europe, through the principal towns of Great Britain, and through the districts, streets, courts, and houses of each individual town, is in strict accordance with this view.

At the commencement of these investigations, it was believed that cholera, typhus, and other epidemic diseases were imported; this impression being derived from the observation of the frequency of their recurrence in migratory populations, whereas we have shown in our Report on Quarantine that in overcrowded low lodging-houses, the worst of fever nests in every town, as well as in close, overcrowded, and filthy ships, the conditions being the same as in a stationary population, the results are the same; and that the tramping about from town to town in the open air, except when the strength is exhausted by fatigue, instead of increasing, tends to lessen disease.

We have elsewhere stated that whereas it was formerly believed that the most powerful predisposition to this disease is induced by deficient food and clothing, and that for this reason its chief victims are found among the destitute or persons on the verge of pauperism, a closer observation of facts showed that, while the unfavourable influence of destitution is not to be denied, a far more powerful predisposition is the habitual respiration of an impure atmosphere; that the highest degree of susceptibility is produced where both these conditions are combined, that

is, where people live irregularly, or on unsuitable diet, and at the same time filthily; and that, in places in which a great degree of cleanliness is maintained, the poor as well as the rich enjoy exemption from this disease.

We submit that the tenor of the evidence derived from recent experience affords complete confirmation of these views.

It was stated by the Metropolitan Sanitary Commissioners, that even at that time experience had sufficiently proved that the circumstances which influence the origin and spread of typhus and other epidemic diseases were generally removable by proper sanitary arrangements; that consequently typhus and its kindred diseases are, to a great extent, preventible, and that there was reason to believe that the spread of cholera might be prevented by the like means, namely by general and combined sanitary arrangements.

We submit that the late experience has added to our previous knowledge of the efficiency of sanitary arrangements in checking the extension of this formidable disease. For the evidence which we have now detailed shows,

That where combined sanitary arrangements have been carried into effect the outbreak of the pestilence has been sometimes averted.

That where its outbreak has not been prevented its course has been gradually, and, in several instances, suddenly arrested.

That where material improvements have been made in the condition of the dwellings of the labouring classes there has been an entire exemption from the disease, and that where minor improvements have been introduced the attacks have been less severe and less extensive, and the mortality comparatively slight.

That with reference to the measures of prevention and alleviation which we have thought it our duty to recommend, and in the instances in which circumstances appeared to require it, to enforce, the immunity from the disease has been in proportion to the extent to which those measures have been carried into effect systematically and promptly.

Upon the whole we submit that the facts and results given in this Report have placed in the hands of the Legislature, for administrative execution, measures for checking the progress and lessening the severity, if not entirely preventing the occurrence, of this pestilence; and that the measures preventive of this one epidemic, which only attacks at distant intervals some of our towns and cities, are preventive of typhus and other epidemics, some or other of which are at all times in all our towns and cities, and which produce, as a constant result, nearly as great an average mortality as the apparently more destructive pestilence on its occasional visitations.

But the chief obstacles to the general and early adoption of measures of prevention arise from the difficulty of communicating to those whom it is necessary to convince, such information as may satisfy their minds of the incomparably greater efficacy of measures of prevention than of those that are merely palliative or curative; a persuasion which is only now beginning to make a due impression on the minds, and to direct the professional inquiries even of medical men, and the full importance of which cannot therefore be expected to be at present appreciated by classes less instructed on these subjects.

The Legislature, however, has recognized the full importance of this principle, by adopting it as the fundamental one, both of the Public Health Act and the Nuisances Removal and Diseases Prevention Act; and the late experience has not been wanting in pointing out where the law is defective, and what further provisions are required for fulfilling the intentions of the Legislature. We regard as one of the most important of the results of the experience which we have now endeavoured to describe, the additional ground which it affords for the expectation that material improvement in the physical, and through the physical, in the moral and social condition of the people will result from those permanent works which, under the Public Health Act, may be effected in towns and cities; and we submit that it is, in the mean time, essential to the protection of the public life and health that adequate legislative powers should be given for dealing effectually with those extra-

ordinary and formidable states of disease, the occasional occurrence of which must be expected, until these sanitary works have been completed and have been introduced into all the towns of the kingdom.

All which we humbly certify.

ASHLEY,
EDWIN CHADWICK.
T. SOUTHWOOD SMITH.

Gwydyr House, 14th August, 1850.

TABLE A.

ESTIMATED Burden on the undermentioned 12 Unions of England for Four Years' Maintenance of Widows, Orphans, and Paupers, and Orphans, become chargeable in consequence of Deaths of Relatives from Cholera and Diarrhoea during the Epidemic period of 1848-9.

NAME OF UNION.	Expense of Relief at 4s. per week per head.				Expense of Relief at 3s. per week per head.				Total Expenses of Relief.				
	One Week.		One Year.		One Week.		One Year.		No. of Widows and Orphans.	One Week.		One Year.	
	£.	s.	£.	s.	£.	s.	£.	s.		£.	s.	£.	s.
Bradford	27	5 8	280 16	1,123 4	82	12 6	639 12	2,558 8	109	17 14	920 8	3,681 12	
Cockermouth. . .	41	8 4	426 8	1,705 12	124	18 12	967 4	3,868 16	165	26 16	1,393 12	5,574 8	
Dudley	30	6 0	312 0	1,248 0	83	12 9	647 8	2,589 12	113	18 9	959 8	3,837 12	
Lambeth	81	16 4	842 8	3,369 12	234	35 2	1,825 4	7,300 16	315	51 6	2,667 12	10,670 8	
Leeds. . . .	211	42 4	2,194 8	8,777 12	528	79 4	4,118 8	16,473 12	739	121 8	6,312 16	25,251 4	
Manchester . . .	62	12 8	644 16	2,579 4	181	27 3	1,411 16	5,647 4	243	39 11	2,056 12	8,226 8	
Newcastle-under-Lyne	41	8 4	426 8	1,705 12	88	13 4	686 8	2,745 12	129	21 8	1,112 16	4,451 4	
Portsea	68	13 12	707 4	2,828 16	210	31 10	1,638 0	6,552 0	278	45 2	2,345 4	9,380 16	
Sunderland . . .	66	13 4	686 8	2,745 12	162	24 6	1,263 12	5,054 8	228	37 10	1,950 0	7,800 0	
Tynemouth . . .	106	21 4	1,102 8	4,409 12	279	41 17	2,176 4	8,704 16	385	63 1	3,278 12	13,114 8	
West Bromwich . .	51	10 4	530 8	2,121 12	169	25 7	1,318 4	5,272 16	220	35 11	1,848 12	7,394 8	
Wolverhampton . .	205	41 0	2,132 0	8,528 0	438	65 14	3,416 8	13,665 12	643	106 14	5,548 8	22,193 12	
Total 12 Unions .	989	197 16	10,285 12	41,142 8	2,578	386 14	20,108 8	80,433 12	3,567	584 10	30,394 0	121,576 0	

TABLE B.

PROGRESS OF EPIDEMIC CHOLERA in GREAT BRITAIN, during the 64 weeks ending December 24, 1849, showing the date of the first attack on each Town, as reported to the General Board of Health, exclusive of the Metropolis.

FIRST OUTBREAK, 1848.

<i>October 5.</i> Edinburgh. Leith.	<i>November 25.</i> Barking. Libberton. Inveresk.	<i>December 11.</i> Ruthwell. Cadden. Rothsay.	<i>December 21.</i> Holyhead. Coatbridge. Paisley.
<i>November 6.</i> Sunderland. Hounslow. Lasswade.	<i>November 27.</i> Staines. Chesham.	<i>December 13.</i> Berwick-on-Tweed. Newcastle-on-Tyne. Campsie. Cumnock. Castle Douglas. Glencairn. Cranston-by-Ford.	<i>December 22.</i> Dumbarton. Jedburgh. Renfrew.
<i>November 8.</i> Chelmsford. Tynemouth. Falkirk.	<i>November 29.</i> Monkwearmouth. Dalkeith. Maxwelton. Dunbar.	<i>December 14.</i> Chatham. Hoddam.	<i>December 23.</i> Dalziel.
<i>November 10.</i> Ecclesall Bierlow.	<i>November 30.</i> Preston Pans.	<i>December 15.</i> Tinwold.	<i>December 26.</i> Hemel Hempstead. Downham Market. Cardross. Hamilton.
<i>November 11.</i> Honiton.	<i>December 1.</i> Epsom. Coldstream. Bothwell. Kelso.	<i>December 16.</i> Hertford. Stirling. Kirkintilloch. Builth.	<i>December 27.</i> Bromley. Moffatt. Bo'ness. Cambeltown. Eastwood.
<i>November 15.</i> Haddington. Brechin.	<i>December 2.</i> Tranent.	<i>December 18.</i> Cambridge. Preston-Kirk. Greenock. Thornhill. Monkland. Blantyre.	<i>December 28.</i> Bury St. Edmonds. Carlisle. Crail.
<i>November 16.</i> Glasgow. Cramond.	<i>December 4.</i> Wisbeach. West Ham. Waltham Abbey.	<i>December 19.</i> Liverpool. Clossburn.	<i>December 29.</i> Reading. Chesterfield. Durrisddeer. Tarbert.
<i>November 17.</i> Dumfries.	<i>December 5.</i> Pontefract. Larkhall.	<i>December 20.</i> Isle of Wight. Buittle.	<i>December 30.</i> Stranraer. Bathgate.
<i>November 20.</i> Dysart.	<i>December 6.</i> Plaistow.		
<i>November 22.</i> Chesham, Bucks.	<i>December 7.</i> Yetholm. Kilpatrick.		
<i>November 23.</i> Great Grimsby. Selby.			
<i>November 24.</i> Lowestoff.			

FIRST OUTBREAK, 1849.

<i>January 1.</i> Radford.	<i>January 13.</i> Margate. Howden. Mileham.	<i>January 29.</i> Alcester. Dunfermline. Helensburgh.	<i>February 17.</i> Epping. Freebridge Lynn. Kilmorie.
<i>January 2.</i> Bury St. Edmunds.	<i>January 15.</i> Melrose. Dumpace. Stevenston. Aldenharn.	<i>January 30.</i> Aberdeen.	<i>February 22.</i> Woodford. Hexham.
<i>January 4.</i> Kilsyth. Wishawtown.	<i>January 16.</i> Selkirk. Cambuslang.	<i>January 31.</i> Thames Ditton. Dundonald.	<i>February 23.</i> Darlington. Bowmore.
<i>January 5.</i> Shotts.	<i>January 17.</i> Wiston.	<i>February 1.</i> Ware. Irvine. Peebles.	<i>March 1.</i> Bradford, Yorkshire. Rugby. Kilbride. Isle of Lewis.
<i>January 6.</i> Thorne. Dundee. Ayr. Port Glasgow. Eaglesham.	<i>January 18.</i> Bowmore.	<i>February 2.</i> Ancram.	<i>March 14.</i> Morpeth.
<i>January 8.</i> Mauchline. Both Kennar. Inverness.	<i>January 20.</i> Galston. Kilmarnock.	<i>February 5.</i> Eastry. Kircaldy. Tillicoultry. Clackmannan.	<i>March 15.</i> Kinnaird.
<i>January 9.</i> Kilbarchan.	<i>January 22.</i> Anderston. London. Kilbirnie.	<i>February 7.</i> St. Quivox. Lochwinnoch.	<i>March 20.</i> South Shields.
<i>January 10.</i> Wakefield. Kilmaddock. Donne.	<i>January 23.</i> York. Glendale. Rickerton. Oban. Dumblane. Dreghorn.	<i>February 12.</i> Hitchin. Girvan. Alloa.	<i>March 27.</i> Gravesend. Durham.
<i>January 11.</i> Knapdale.	<i>January 24.</i> Dunoon. Kincardine.	<i>February 13.</i> Swaffham. Carshalton. Galashiels. Auchinleck.	<i>March 29.</i> Dailly.
<i>January 12.</i> Reedham. Gateshead. Mid-Calder. Bonhill. Kilmaddock.	<i>January 27.</i> Goole. Rickmansworth. Queensferry.	<i>February 14.</i> Stow. Ayr.	<i>April 14.</i> Kinnoul.
			<i>May 3.</i> Sproutson. Crosshill.

SECOND OUTBREAK, 1849.

<i>May 10.</i> Gloucester. Liverpool. Durham. Rhymney.	<i>June 25.</i> Carnarvon. Aberavon. Taibach.	<i>July 13.</i> Milton-next Sitting- burn. Dartford. Brecon. Salisbury. Frampton-on-Severn. Arundel. Gosport. Warminster.	<i>July 21.</i> Alton. Sunderland. Leigh. Basingstoke. Edinburgh.
<i>May 14.</i> Keynsham.	<i>June 26.</i> Harwich.		<i>July 23.</i> St. Austell. Cambridge. Canterbury. Hales Owen. Axbidge. Hull.
<i>May 21.</i> Oldham. Holyhead. Cramond.	<i>June 28.</i> Cuckfield. Salford.	<i>July 14.</i> Ashton-under-Lyne. Poole. Wisbeach. Morton. Brighton.	<i>July 24.</i> Aberdare. Alderbury. Errol. West Derby. Holywell. Southampton. Sheffield. Bingley. Wokingham.
<i>May 31.</i> Neath. Merthyr Tydfil. Kingsclere.	<i>June 29.</i> Arlingham. Plaistow.	<i>July 16.</i> Market Drayton. Stoke-upon-Trent. West Ham. Leeds. Inverness. Findhorn-Forres.	<i>July 25.</i> Stanstead. Great Marlow. Bradwell. Portpatrick. Bourne. Stockport. Ellesmere. Castle Donnington. Bletchingham. Guildford.
<i>June 2.</i> Clifton. Cardiff. Dundee.	<i>June 30.</i> Worcester. Nantwich.	<i>July 17.</i> Bromsgrove. York.	<i>July 26.</i> Isle of Sheppey. Bedminster. Shrewsbury. Lancaster. Godstone. Stonehouse. Little Stanmore, Hen- don. Gomersal. Bridgend and Cow- bridge. Newton Abbot. Ormskirk. Stone.
<i>June 4.</i> Swansea. Newport (Monmouth.) Rainham.	<i>July 2.</i> Wootton-under-Edge. Plympton St. Mary. Monefieth.	<i>July 18.</i> Anglesey. Egham. Coventry. Whitstable. Prescot. Mevagissey.	<i>July 27.</i> Bromley. Gravesend. Aylesbury.
<i>June 7.</i> Monmouth. Newkesbury.	<i>July 3.</i> Staines.		
<i>June 8.</i> Plymouth. Bradford.	<i>July 4.</i> Chorlton. Gaydon. Suffolk Hospital. Burslem.	<i>July 19.</i> Newent. Bury. Epsom. Romsey, Hants. Rye. Findham. Wrexham. Newtown, Montgome- ryshire.	
<i>June 9.</i> Stony Kirk.	<i>July 5.</i> Warrington. Aberdeen.	<i>July 20.</i> Llanelly. Yeovil. Burnley. Padiham. Leith.	
<i>June 13.</i> Manchester. Birkenhead. Bristol.	<i>July 6.</i> Tynemouth. Ship "Tory," Graves- end.		
<i>June 16.</i> Garliestown. Wolverhampton.	<i>July 7.</i> Portsmouth. Newbury.		
<i>June 18.</i> Wheatenhurst. Dowlais. Newton Ferrers.	<i>July 9.</i> Isle of Wight. Devonport. Rochford.		
<i>June 20.</i> Stroud. Hambledon. Bideford.	<i>July 11.</i> Ipswich.		
	<i>July 12.</i> Pontypool.		

SECOND OUTBREAK, 1849—*continued.*

July 27—continued.
 Bridgnorth.
 Deal.
 Burnham.
 Stanwell.
 Yelmpton.
 Selby.
 Kinloss.
 Orsett.
 Hollingbourn.
 Cliff, Rochester.

July 28.
 Reading.
 Tormorden.
 Morecroft.
 Horsham.
 Wilton.

July 30.
 Sculcoates.
 Finchley.
 Isle of Thanet.
 Thetford.
 Fareham.
 St. Germans.
 Milford Haven.
 Clydach.
 Spalding.
 Kembach, Cupar.

July 31.
 Hastings.
 Arbroath.

August 1.
 Maidstone.
 Darlington.
 Berkhamstead.
 Romford.
 Brechin.
 Crickhowell.

August 2.
 Faversham.
 Preston.
 Runcorn.
 Ferrybridge.

August 3.
 Barking, Essex.
 Carmarthen.
 Woodford.
 Maesteg.
 Truro.
 Ewell.
 Donington, Lincoln.
 Richmond, Surrey.

August 3—continued.
 Kingston, Surrey
 Crayford.
 Wallingford.
 Chiswick.
 Foleshill.
 Mortlake.
 Chester.
 Newcastle-under-Lyme.

August 4.
 Redwick, Thornbury
 Tavistock.
 Reigate.
 Westerham.
 High Wycombe.
 Malton.
 Twickenham.
 Grantham.
 Seacombe, Birkenhead.
 Britford, Salisbury.
 Erith.
 Old Brentford.

August 7.
 Goole.

August 8.
 Ulverstone.
 Penydarran
 Claydon.
 Gunville, Isle of Wight.
 Dagenham.
 Garratt, Surrey
 March, Cambridge.
 Oxford.
 Ramsgate.
 Marston, Oxford.
 Broadstairs.
 Stourbridge.
 Skelton, Stoke-upon-Trent.
 Atherton, Leigh Union.
 Amersham.
 Woolton, Prescot Union.
 Beccles, Suffolk.
 Whitby.
 Caistor, Lincoln.
 Halifax.
 North Bierley Union.
 Horton.
 Easington Union.
 Horwick, Bolton.
 Epworth-Thorne.
 Ecclesall Bierlow.

August 8—continued.
 Longbenton, Tyne-mouth.
 Thorne.
 St. Andrews.
 Birgham-Eccles by Coldstream.
 Hawick.
 Gainsborough

August 10.

Kelso.

August 13.
 Bolton.
 Morristown, Swansea.
 Wellington, Salop.
 Madeley Union, Salop.
 Pilton, Barnstaple.
 Harrow.
 South Brent, Totnes.
 Dean Prior.
 Brentford.
 Beeralston, Tavistock.
 Uxbridge.
 Beerferris, Tavistock.
 East Stonehouse.

August 14.
 Kenton St. Thomas.
 Southover Wells, Somersetshire.
 Broseley, Rusholme.
 Marden, Maidstone.
 Yarmouth, Isle of Wight.
 Newport, Isle of Wight.
 Coddington, Aylesbury
 Tunstall, Wolstanton.
 Hunslet.
 Market Weighton.
 Newport-Forgan.
 Enfield.
 West Houghton.
 Hillingdon.
 Crail.
 Bentford.

August 15.
 East and West Looe, Cornwall.
 Howden Union.
 Maryport.
 Whittlesey.
 Dewsbury.
 Tranmere.
 Keele, Newcastle.

August 16.
 Liskeard.
 St. Asaph.
 Rotherham.
 Wolstanton and Burslem.
 Bridgwater.
 Greenock.
 Wakefield.
 Gateshead.
 Somerset, Dewsbury Union.

August 17.
 Bromley Union.
 Hosham.
 Lansanilet.
 Logierait.
 Cupar Angus.

August 18.
 Huddersfield.
 North Aylesford.
 Devizes.
 Shepton-Mallet.
 Sheerness.
 Tredegar,
 Haddington.

August 20.
 Fordingbridge.
 Weymouth.
 Lockersbie.
 Crediton.
 Poole, Montgomeryshire.

August 21.
 Stockton.
 Corwen.
 Bridlington.
 Welwyn Union.
 Fortrose.

August 22.
 Portland.
 Kirkham, Lancaster.
 Eton.

August 23.
 Seaham Harbour.
 Sunbury.
 South Stoneham.
 Beith.
 Long Ashton, Bristol.
 East Ashford Union.
 Cavers.
 Wigan.

SECOND OUTBREAK, 1849—*continued.*

<p><i>August 23—continued.</i> Great Bolton. Chirtou, Tynemouth. Swindon, Wilts. Potterne, Devizes, Middleborough, Scotland.</p> <p><i>August 24.</i> Headington, Oxford. North Petherton. Ilford. Leek. Chertsey. Hertford. Eltham. West Ashford. Croydon. Thatcham. Keston. Habersham Eaves. Carnoustie.</p> <p><i>August 25.</i> East Sheen. Dover. Alderbury, Salisbury. Margate. Hartleford. Woodford Bridge. Barnes.</p> <p><i>August 27.</i> Congleton. Melcombe Regis. Worfield, Bridgnorth. Linton. Handborough. Roxeth.</p> <p><i>August 28.</i> Ware. Droitwich. Bowling. Great Grimsby. Great Yarmouth. Wilton by Hawick.</p> <p><i>August 29.</i> Dunstable. Barnet. Folkestone. Hanwell. Twynning. Perth. Hardingstone. Merton Rush. Upton. St. Leonard's, St. Andrews. Cullercoats.</p>	<p><i>August 30.</i> Kingstanton, Devon. Clarborough. Headcorn, Maidstone. Windsor. Yarm. Hitchin. Manningham. Woodspeen East by Newbury. Maidenhead. Liff and Benvie Yetholme.</p> <p><i>September 1.</i> Kilspindie, Errol. Llangfelach, Swansea. Dorchester. East Grinstead.</p> <p><i>September 3.</i> Blair Drummond. Chard. Barnstaple. Chipping Norton. Kirkinnen, Wigton. Stokesley Union, North Allerton. Kingswinford, Stourbridge. Penzance. Norwich.</p> <p><i>September 4.</i> Claycross, near Chesterfield. Walton. Woburn, Bucks. Barnard Castle. Bellbutts. Farnworth and Hulton, Bolton Union.</p> <p><i>September 5.</i> Skipton Union. Staniford. Chesterfield. Clitheroe. Shipley, Yorkshire. Pemberton. Ferryport-on-Craig.</p> <p><i>September 6.</i> Chorley. Scholes District, Wigan Union. Wells. Ashton-in-Mackerfield. Haslingden Union.</p>	<p><i>September 7.</i> West Bromwich. Sutton Valence and Otham, near Maidstone. Totnes. Northwich Union. Rudston.</p> <p><i>September 10.</i> Stilton. Tormaham. Chailey. St. Ives. Kerriemuir. Denholm. Richmond, Yorkshire. Auchmithie. Dores.</p> <p><i>September 11.</i> Kidderminster. Wallasey. Swaffham.</p> <p><i>September 12.</i> Witney. Rockingham. Pocklington. Blackrod, Wigan. Rugby. Herwain, Merthyr Tydvil.</p> <p><i>September 13.</i> Seaton Delaval. Wincanton. Great Easton, Lincolnshire. Stirling. Kinnoull, Perth.</p> <p><i>September 14.</i> Tunbridge. Wallsend, Tynemouth. Bishop Stortford. Kinfauns, Perthshire. Dumbarton.</p> <p><i>September 15.</i> Beaconsfield. Lower Tooting. Haughley, Stowmarket. Reeham, Norfolk. Hanley and Shelton. Willenhall. Alnwick. Roseneath. Dunfermline. Montrose.</p>	<p><i>September 17.</i> Cottisham. Blyth and Newsham. Tenterden. Pembroke. Hexham. Kettering. Wednesfield. Eyemouth, Berwickshire. Gwennap, Redruth Union. Uppingham. Mangotsfield.</p> <p><i>September 18.</i> Walton, West Derby. Wylam, near Newcastle-under-Lyme. Stratford-on-Avon. Maldon. Dunbar. Knockbain.</p> <p><i>September 19.</i> Caton Gilbert. Feltwell. Epping. Bo'ness. Preston Kirk.</p> <p><i>September 20.</i> Kirsby, near Bolton. Redruth. Berwick-upon-Tweed.</p> <p><i>September 21.</i> Haverfordwest. Amlwch. Corbridge. Row-by-Helensburgh.</p> <p><i>September 22.</i> Hutton District. Dysart. East Retford. Carisbrooke, Isle of Wight. Burnley and Havergam Eaves. Eccles. Depwade.</p> <p><i>September 24.</i> Bawtry, Yorkshire. Buxton. Aylesbury Union. Kingsbridge, Devon. Old Machar, Aberdeen. Shiffhall. Herne-bay.</p>
--	---	---	---

SECOND OUTBREAK, 1849—*continued.*

<p><i>September 25.</i> Hucknall Terard. Catterick District. Tain. Munlochy. Pailsley.</p> <p><i>September 26.</i> Nuneaton. Tweedmouth. Market Lavington, Devizes. Staithe. Leven, Fife. Abernethy.</p> <p><i>September 27.</i> St. Mary Church, Tor- quay. Upway, Dorchester. Kinclaven.</p> <p><i>September 28.</i> Bedford. Sandgate, Kent. Lauder. Portwilliam.</p> <p><i>September 29.</i> Colne, Burnley. West Calder. Perm, Staffordshire. Lochgilly, Auchteri- derran. North Nibley. St. Vigeans, Arbroath. Gamlingay (Cam- bridgeshire). Abbotshall, Kirkaldy. Kersley, Bolton. Braunton, Barnstaple. Langharne.</p> <p><i>October 1.</i> Buckden, Hunts. Preston Pans. Guisborough. Chelmsford. High Littleton, Bristol Thorn Falem, Taunton Glendall.</p> <p><i>October 2.</i> Plomesgate Union. Fraserburgh.</p>	<p><i>October 3.</i> Ketley. Derwent, Weardale. Hanston, Pasley.</p> <p><i>October 4.</i> Godney. Lichfield. Inverallochy and Cairn- bulg, Aberdeenshire.</p> <p><i>October 5.</i> Bangor. Sandy, Bedfordshire. Ratcliff on Trent. Inverkeithing.</p> <p><i>October 6.</i> Long Handborough, Woodstock. Ferrydar, Craig, Mon- trose.</p> <p><i>October 8.</i> Girtford. Wick, Caithness. Belhaven, Dunbar.</p> <p><i>October 9.</i> Chilton Super, Polden Hill. Upholland District.</p> <p><i>October 10.</i> Burton-upon-Trent. Hillingbourne.</p> <p><i>October 11.</i> Boddon, Peterhead. Newark. Cottishall. Dunse.</p> <p><i>October 13.</i> Hutches, near Fareham. Dalgety, Inverkeith- ing.</p> <p><i>October 15.</i> Port Glasgow.</p> <p><i>October 16.</i> Langholm.</p> <p><i>October 17.</i> Ince District, Wigan. Peebles. Ancrum.</p>	<p><i>October 19.</i> Kenwyn.</p> <p><i>October 20.</i> Loughborough.</p> <p><i>October 22.</i> Colsham. Kinghorn.</p> <p><i>October 23.</i> Riecall. Upholtam. Houston, Renfrew- shire. Panbride, Carnoustie.</p> <p><i>October 24.</i> Ilkeston. Nigg, Aberdeen.</p> <p><i>October 25.</i> Peterhead.</p> <p><i>October 27.</i> Clutton Union.</p> <p><i>October 30.</i> Newtown, Bo'ness. Greasley.</p> <p><i>November 2.</i> Milton by Balgerine, Markwick.</p> <p><i>November 3.</i> East Normanshire.</p> <p><i>November 5.</i> Outwell, Norfolk. Lilliesleaf.</p> <p><i>November 7.</i> Carnock by Dnnferm- line.</p> <p><i>November 8.</i> St. Combs, Linmay, Aberdeenshire. Culross.</p> <p><i>November 12.</i> Alloa.</p> <p><i>November 13.</i> Kirkaldy.</p>	<p><i>November 14.</i> Mexbro' District, Doncaster.</p> <p><i>November 16.</i> Muryhill, Glasgow. Pelwarth, Dunse, Berwickshire.</p> <p><i>November 19.</i> Coldingham by Ayton, Berwickshire.</p> <p><i>November 20.</i> Forse by Libster, Caithness.</p> <p><i>November 21.</i> Cairnbulg, Inveraller- hay and Charleston, Saline, N. B.</p> <p><i>November 22.</i> Eastray Union. Althorpe, near Crowle.</p> <p><i>November 23.</i> Gifford, Yester, Had- dington.</p> <p><i>November 27.</i> Bolton by Haddington.</p> <p><i>November 28.</i> Petsligo.</p> <p><i>December 1.</i> Cockpei, Edinburgh.</p> <p><i>December 3.</i> Preston Kirk, East Lothian.</p> <p><i>December 7.</i> Paulton, Clutton. Camesten and Rad- stock, Clutton. Torryburn.</p> <p><i>December 13.</i> Ash, Eastray.</p> <p><i>December 24.</i> Burntisland.</p>
---	---	--	---

APPENDIX A.

REPORT ON THE EPIDEMIC CHOLERA OF 1848-49.

MY LORDS AND GENTLEMEN,

As cholera in its epidemic form may be said to have subsided for the present, with the exception of a few scattered cases, it becomes a portion of my public duty to report to the General Board of Health on the progress of the epidemic, and on the manner in which the regulations issued to the various public bodies have been carried into effect, and the results which have followed.

On the 26th September, 1848, when on the eve of proceeding to Germany in company with Mr. Grainger, to inquire into the progress of the cholera in that country, we were directed to go to Hull in consequence of the appearance of several cases of the disease on board a vessel in the port. After completing our inquiry, and when about to sail for Hamburg, Mr. Grainger was directed by telegraphic dispatch to proceed thither alone, while I remained in Hull, whence I was directed to go to Sunderland to inquire and report as to certain cases of cholera stated to have occurred on board vessels which had arrived from Hamburg. While so engaged, I was directed by telegraph on the 6th October, 1848, to proceed to Edinburgh, an outbreak of the disease having taken place in that city.

I left Sunderland immediately, and arrived in Edinburgh the same evening, when I learned that two cases of cholera had occurred simultaneously, one in an underground flat of a house at the top of Leith-walk, and another in Leith in a wretched lodging-house in a narrow, filthy cul-de-sac behind King-street. This latter case took place under the same roof, and within a few feet of the spot from whence the epidemic of 1832 commenced its career. The particulars of these cases, and the circumstances attending the subsequent progress of the disease, were at the time fully reported to the Board. Suffice it to say that cholera, true to the laws by which epidemics are governed, followed the usual track of the fevers by which Edinburgh and Leith are scourged, locating itself in the same filthy closes, occupying the same ill-ventilated, over-crowded tenements, not unfrequently carrying off its victims from the self-same rooms which its fatal ravages nearly depopulated in the epidemic of 1832.

In a few days after the disease had struck the northern metropolis, it appeared in the neighbouring towns of Newhaven, Portobello, Loanhead, and a number of other localities, and reached the west of Scotland on the 11th November, when it attacked the city of Glasgow, and subsequently a large number of manufacturing towns and villages in Lanarkshire, Ayrshire, Dumfriesshire, and other counties in the south and west of Scotland. A few sporadic cases and local outbreaks of the disease occurred in England during the same period. The first stroke of the epidemic appeared to have subsided early in May, 1849, although the disease still lingered in many parts of the country. It again assumed an epidemic form in the latter end of May, and during the summer and autumn nearly every large city and town in England was attacked, as well as several towns in Scotland, the last severe seizure being that of the inmates of Taunton Union workhouse, in the beginning of November. The following affected places have been at various times under my inspection :—

Edinburgh	Loanhead
Leith	Newhaven
Portobello	Musselburgh;
and other places in the vicinity of the Scottish capital.	
Stirling	Coatbridge
Glasgow	Carnbroe
Dumfries and Maxwell-	Paisley
town	Pollockshaws ;
with other villages in Lanarkshire and the neighbouring counties.	
Kilbirnie	Sunderland
Kilmarnock	Inverness
Hamilton	Plymouth, where I went to
inspect an emigrant ship on board of which the disease had appeared.	
Merthyr Tydfil and	Dundee
Dowlais *	Arbroath
Cardiff	Liverpool
Bristol	Wolverhampton
Clifton Union	The Metropolis partially.
Taibach and neighbouring	Bilston
villages.	Willenhall
Gloucester	Alnwick
Romsey	Manchester
Hull	Sheffield
Leeds	Taunton.

I had, besides, to maintain a large correspondence with other places which I was not able to visit personally.

Were I to report specially on the circumstances attending the epidemic attack in each individual city and town, some amount of repetition would be necessary, and to avoid this I shall state as briefly as possible all those general principles which the extensive opportunities of observation at my disposal appeared to establish, and use the experience of individual towns, as illustrations in order to impress the deductions more clearly on the mind.

* At the commencement of but not during the epidemic.

In carrying out this plan, it will be necessary to revert to and affirm afresh well-known and acknowledged truths in sanitary science ; but the subject is one of so much national importance, and the facts so liable to be forgotten, that they require to be kept before the public to obviate as far as possible the recurrence of those disastrous results which in several instances have arisen from the neglect of past experience.

It must now be considered an established truth in science, that the health, the well-being, and the duration of the life of man are intimately connected with the observance of the natural laws of the universe in which he dwells. The acknowledgment of this fact is not, however, sufficient to ensure obedience to those laws. Men must be taught individually and collectively to obey them ; each man for himself ; every family, in order to ensure its possession of that immunity from disease which the Great Creator obviously intended his creatures to possess ; and all men acting in their social or corporate capacity for the protection of each other, and of the entire community.

There is a free choice given. On the one hand there is obedience and health, with all the numberless blessings and privileges which go with it ; on the other, there is neglect and its infallible consequences, which no human power can fully avert when they are entailed, and these are disease, death, pauperism, loss of property, ignorance, debasement, crime.

The social evils of this neglect are at present ramified throughout the entire framework of society. A vast amount of property has grown up in all parts of the country, of which it is not too much to assert that it is as productive of misery to the people, as it is unproductive of legitimate revenue to the possessor. Large masses of population are congregated together without any attention to those conditions on which their healthy existence depends, and until very recently it was even denied that there were any special causes of disease which occasioned a greater mortality in towns than was the common lot of the human race. Melancholy experience has however proved that unless a very different view be taken of those new duties which devolve on all men, by the very act of their social union, and suitable means of protection adopted, our country will exhibit a progressive descent in the health and productive power of its people, and a corresponding degradation in their moral and social condition, of which, indeed, a low sanitary state must now be considered as an almost invariable exponent.

SECTION I.

LOCALIZING CAUSES OF CHOLERA.

BEFORE proceeding to describe the various measures of a medical preventive nature carried out under the regulations of the General Board of Health, it is necessary that I should enter shortly into the reasons for their adoption, by describing those special conditions attending the epidemic seizure which they were intended to meet. Sufficient evidence will presently be advanced to show that cholera is by no means so capricious in

its attacks as has been generally supposed, but that on the contrary it is propagated according to certain fixed laws, although the limits of these have not as yet been precisely defined. Whether or not there be sufficient proof that the epidemic influence progresses from point to point, and that it is not always universally diffused over the whole face of a country,—whether or not there be also evidence to show that the intensity of that influence is not necessarily equal throughout the area within which it operates,—and whether or not human means have any control over these properties of the epidemic; it is nevertheless of extreme importance to know that there are other laws, the modifying conditions of which can be to a great extent influenced. By far the most important of these laws is that which will frequently be referred to under the term *localization*, or, in other words, that property which is possessed by certain states of the constitution, or by certain well-marked characteristics of special localities, by virtue of which the epidemic obtains such power over the resisting vital forces of individuals, as to produce that class of phenomena usually ranked under the general designation of cholera.

During the late epidemic the following were among the more frequent indications of the prevalence of an epidemic constitution:—

General malaise.

Uneasiness of stomach or bowels.

Slight dyspepsia.

Flatulence.

Derangements of the nervous and vascular systems, such as transient sensations of giddiness, or fulness in the head, or partial coldness of the surface, &c.; occasionally a slight degree of timidity; sometimes a tendency to sore throat, or symptoms approaching those of influenza.

An open state of the bowels, proceeding to relaxation or painless diarrhoea.

Such symptoms have very frequently prevailed over considerable epidemic areas, without leading to any more serious disease. It has happened, however, that in certain constitutions, predisposed by irregular and dissipated habits, these slight premonitions have been followed by rapid and fatal attacks of cholera. It appeared as if the weakened vital stamina, after resisting to a certain point, suddenly gave way, while the natural powers of other individuals, which had not been put to so severe a test, were sufficient to preserve life.

Under similar circumstances specific acts of intemperance in food or drink, over-fatigue, or perhaps sudden alarm, have destroyed the resisting power. I have likewise known a number of instances in which individuals, living in comparatively healthy situations, have been suddenly destroyed by the use of purgative medicine, and that in very moderate quantity. Saline purgatives, which under ordinary circumstances may be used with advantage, are invested with poisonous properties in relation to the altered constitutional state produced by the epidemic influence. A similar fact has been observed in regard to almost every form of aperient. A case came under my own knowledge, in which an ordinary dose of rhubarb and magnesia with mint-water produced a rapid and fatal attack of cholera in a healthy young woman who had taken the medicine as an aperient.

Improper articles of food have not unfrequently produced a like result ; a remarkable illustration of which will be found in the case of the Prussian sailors on board the barque "Pallas."

The influence of such causes in producing attacks of cholera has not been uniformly great. In some epidemic attacks imprudences have been committed with impunity, which in others have been attended with fatal results, while under neither of the circumstances alluded to did the disease distinctly localize itself. It appears reasonable, therefore, to conclude, that it is possible for the population of one locality to become more predisposed than that of another similarly circumstanced, simply from the greater intensity of the epidemic influence.

It is of great importance to keep in mind this distinction, because, in issuing instructions for the guidance of the population, as to diet, regimen, &c., it would be manifestly insufficient to take the previous experience of any one locality as a foundation on which to rest those precautionary measures to be recommended for every other. I have met with instances in which eminent members of the medical profession objected to certain of the recommendations of the General Board of Health, in regard to the points under discussion, from their not being entirely borne out by their own experience. It would certainly be more satisfactory were it practicable to advise those measures which would be precisely adapted to every given condition, but, as such is not the case, general recommendations founded on the broadest basis of experience must obviously be the best.

It is possible to conceive that an epidemic constitution might be so intense as to destroy every human being exposed to its influence, although living under the best possible sanitary conditions, just as if the atmosphere were to become suddenly converted into carbonic acid gas. Such, however, does not appear to be the function of epidemics. They are *corrective* rather than *destructive*, and one of their special objects seems that of arousing mankind, by signs which cannot be mistaken, to a sense of the necessity of recognising and obeying the laws of his physical existence. They have an indirect bearing also on his moral state, by exciting to action the dormant powers of observation, intelligence, and sympathy ; while on the other hand, those very sanitary evils which tend to propagate epidemics have a direct influence in degrading the human race, and in leading to ignorance, vice, and crime.

Under such circumstances men are most readily affected by the passion of fear, and the instinct of self-preservation leads them to inquiries and physical reforms which remove those material causes from which originates a debased state of health both of body and mind.

Epidemics invariably haunt the same localities. A few scattered drops of the storm may fall elsewhere, but its violence is spent where its purifying influence is most required. I shall presently describe and illustrate those conditions which cholera finds most congenial. It is under these that a new class of phenomena is developed. We find certain appearances among the people, which, when once observed, can hardly be forgotten. The countenance has a peculiar aspect, half anxious, half apathetic. The eyes are suffused, and often surrounded by a faint areola. The skin has a dusky reddish hue, as if from impeded circulation. I have found such persons averse to exertion, and indisposed to take any steps for their safety. They have usually denied being ill, and refused to leave the locality ; and I have not

unfrequently been able to predict the deaths of individuals from their positively objecting to being interfered with. Existing cases of fever, or other epidemics, change their aspect and fall rapidly into hopeless collapse. A very fatal disease suddenly breaks out, marked by the following symptoms:—

Diarrhœa.

Purging of serous matter.

Vomiting.

Cramps.

Coldness.

A peculiar aspect of countenance and expression of voice.

Pain in the stomach and bowels.

Intense thirst.

Suppressed urine.

Difficult respiration.

Collapse.

A brownish purple aspect of the skin, with occasional eruption.

Blueness.

Pulselessness.

Shrivelling up of the body, and wrinkling of the skin of the hands, just as if they had been soaked in water.

A certain listlessness of mind, from which, however, the patient can be roused into clearness of intellect, the body appearing almost dead before life is extinct.

Death.

The development of these diseased states has occupied very different periods of time in different localities and constitutions. Sometimes their course has extended over a period of several days, and at others death has ensued within two or three hours of the moment of seizure. A state of hopeless collapse has sometimes been produced in a few minutes, by the passing of a single large watery evacuation, in persons who had risen from bed apparently in their usual health. Instances have also occurred of persons dropping down in the street and dying shortly after.

It has been generally observed that the larger proportion of attacks have taken place through the night, a point in the history of the epidemic which is well illustrated by the following table supplied to me by Dr. Alex. M. Adams, Glasgow:—

Period of Attack.	8 A.M. till 12 Noon.	12 Noon till 4 P.M.	4 P.M. till 8 P.M.	8 P.M. till Midnight.	Midnight till 4 A.M.	4 A.M. till 8 A.M.	Totals.
Cases .	35	18	32	33	56	51	225
Deaths .	26	8	19	18	20	27	118

It will be perceived that between the hours of 8 P.M. and 8 A.M. the cases amounted to 140, and the deaths to 65, against 85 cases and 53 deaths occurring during the corresponding twelve hours of the day.

The most important practical point which it behoves us to know is, that the severe manifestation of the presence of cholera described above

does not take place over the whole district covered by the epidemic influence. Were this the case, a large proportion of the people in affected countries must necessarily perish. All experience has, however, proved that a certain portion escape, while another portion are destroyed, and the fatal outbreaks of the disease are invariably connected with one or more of the following local defects:—

Overcrowding.

Dampness.

Filth.

Want of ventilation and atmospheric pollution.

Proximity to graveyards and other nuisances, pigsties, offensive sewers, &c.

Narrow, closely-built, and confined neighbourhoods, bad water, natural defects of situation. The impregnation of the subsoil of towns with organic matters from filthy streets, cesspools, and other nuisances. Imperfect sanitary works, and other similar causes.

It will be observed that the diseased conditions likely to arise from the influence of such causes are those connected with atmospheric impurity, a deranged state of the digestive functions, and depression of the vital powers. In all localities where they exist there is a great preponderance of disease and mortality; but I am inclined to consider the epidemic susceptibility, properly so called, as distinct from the ordinary diseased states. It is not always the most sickly who suffer from epidemics; on the contrary, a large number of victims from fever and cholera are taken from amongst persons in the prime of life; and it has been often remarked, that the wards of cholera hospitals have shown a considerable proportion of robust men and women amongst their occupants.

The following table of the ages of 2322 cholera cases, and 1058 deaths from cholera, occurring in Glasgow, will prove how heavily the epidemic fell on the productive periods of life:—

AGES . . .	Under 10 Years.	10 to 20.	20 to 30.	30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.
Cholera cases.	192	315	616	532	415	138	93	21
Deaths . .	91	113	269	234	195	77	65	14

It thus appears that, out of 2322 cases, not fewer than 1148, or nearly 50 per cent., occurred between the ages of 20 and 40; and that, out of 1058 deaths, 503, being a similar percentage, occurred between the same ages: circumstances which show how important it is in a social point of view that every resource of science should be put in requisition to extirpate the haunts of epidemics. Another proof of the peculiar nature of epidemic susceptibility is afforded by the fact that there have been numerous examples of persons going from healthy districts into localities affected by cholera, and after remaining there a day or two, but without necessarily coming in contact with any diseased individual, dying of the epidemic after their return home, their mere presence in such places

for a certain time being sufficient to produce death. To this class of cases belong a number of the presumed instances of contagion. We have thus two classes of attacks—the first taking place in persons habitually living in unhealthy situations, and in whom the addition of the epidemic influence to pre-existing susceptibility had produced a fatal result; while in the second class, the simple fact of an individual being suddenly exposed to the influence of an affected locality, and without having been apparently exposed to predisposing causes, has led to similar consequences.

All the facts which I have observed have appeared to point to a solution of the following kind: namely, that under the unhealthy conditions above mentioned the epidemic has the power of intensifying itself, or, in other words, multiplying its force of attack, until at last it produces results closely approximating to those of ærial poisons. It appears as if some peculiar organic matter, which constitutes the essence of the epidemic, when brought in contact with other organic matter proceeding from living bodies, or from decomposition, has the power of so changing the condition of the latter as to impress it with poisonous qualities of a peculiar kind similar to its own.

If we could suppose that certain organic impurities, existing in the atmosphere of unhealthy neighbourhoods, passed into the blood through the lungs, so as to follow the circulation, and that similar impurities taken into the stomach with articles of food or drink were likewise absorbed into the blood; if we could moreover suppose that the epidemic influence possessed the power of assimilating such organic matter to its own poisonous nature, we should be enabled to include a number of complex phenomena under a hypothesis which would indicate the requisite measures of prevention.

It is of more importance, however, to know that there are very satisfactory deductions of a practical nature from the phenomena themselves; but before proceeding to discuss these, I shall give the following illustrative facts from the history of the late epidemic:—

ILLUSTRATIONS OF THE LOCALIZING CAUSES OF CHOLERA.

1.—*Errors of Diet.*

I place this illustration first, rather because of its order in time than in importance, for it enables me to give some account of several of the earliest fatal cases of cholera which occurred in England during the late epidemic.

In the end of the summer and early part of the autumn of the year 1848, unequivocal appearances manifested the presence of the epidemic influence on several points of the east coast of England. Occasional outbursts of diarrhœa took place in several towns, and I have been informed that in a village in Holderness, where an epidemic typhus raged, a number of cases suddenly assumed symptoms closely resembling those of cholera. At this period the cholera was ravaging the cities of Northern and Western Europe, and it appeared as if the disease were making unsuccessful attempts to locate itself in this country. In the latter end of August and early in September one or two cases of a very suspicious character took place in Hull, but the disease showed no dis-

position to establish itself at that period. In the course of the month of September the city of Hamburg was suffering severely; and as a good deal of steamboat intercourse exists between that place and Hull, it happened, as was to be expected, that several cases were imported into the latter town, which afterwards proved fatal in different inns and lodging-houses, but in no one instance was there any spread of the disease by communication. At this period a circumstance occurred of a somewhat remarkable nature. A Prussian barque, the "Pallas," had been laid up for a length of time in one of the Hull docks, in consequence of the Danish blockade. Her captain resided at Barth in Pomerania, and when the blockade was removed he engaged nine men to accompany him to Hull, in order to man the vessel. He brought these men to Hamburg by railway, kept them from entering the town, and conveyed them to the river-side, where he hired a boat and saw them rowed out to the steamer which lay in the river. In the course of the evening the vessel drew up to the landing for the purpose of taking in part of her cargo, and three of the men went on shore. They slept at a public-house not far from the quay, and next morning at six o'clock the captain found them all on board quite sober and in good health. At this time there was a good deal of cholera on board the merchant-ships in the Elbe, the river appearing to be the centre of the epidemic attack, but none of the men referred to had been in contact with any affected individuals. They had, however, remained upwards of fifteen hours on the river. The vesselsailed for Hull, and had on board a quantity of plums for the market, of which the men ate largely on the passage. Early on the morning of the second day after leaving Hamburg the steamer arrived at Hull, and the men went on board the "Pallas" the same afternoon. They slept in the round-house on deck, and at nine o'clock next morning the captain was called up and informed that one of the men was dying. He was in a state of approaching collapse and died the same night. Within little more than twenty-four hours afterwards, other four of the crew were attacked, two of whom died. The rest of the men were sent on shore and suffered more or less from diarrhœa, which, however, easily yielded to treatment. The "Pallas" was closely wedged in amongst other vessels, and all communication with her was forbidden. Had the disease been contagious, the precautions which were taken could hardly have prevented its spreading, especially as the crew had actually slept two nights in the town, but no such occurrence took place. It becomes an interesting inquiry as to how these men became affected by the disease. The advocates for the contagious nature of cholera might possibly find countenance for their views in the fact stated, that a number of the crew went on shore at Hamburg, into the very neighbourhood where the disease raged at the time, but it happens that of the four most severe cases, three of which terminated fatally, not one of the sufferers had been on shore at all, although the fifth and slightest case, which recovered after a few hours' illness, occurred in the person of one of the men who had been on shore, and who was moreover the individual last attacked. The simple facts of the case appear to explain the whole occurrence. The men were brought from a healthy town into an epidemic centre, where they remained a sufficient time to have the constitution thoroughly affected by its influence. Possibly they

might have resisted the morbid state, had it not been for the very serious error as to diet which they committed. The eating of a few plums would certainly, under ordinary circumstances, have produced no such fatal results, but during an epidemic constitution such indulgence is well known to be fraught with extreme danger.

The General Board of Health requested that the sanitary state of the town of Hull should be examined, in order to ascertain whether any serious public danger existed. After a careful inquiry by Mr. Grainger and myself, we were able to report that the class of diseases which were then prevalent in the town, and had been so for some time previously, afforded no ground for alarm, as in our opinion the cholera cases had been imported, just as any other form of disease might have been, that they presented no evidence whatever of being contagious, and that nothing further was necessary than to organize such a preventive machinery as the westward progress of the epidemic indicated as desirable.

Within some weeks from this time one or two cases took place in the town, but at a considerable distance from the point where the "Pallas" had lain, and which she had left shortly after the deaths had occurred on board. Several fatal cases also took place on board of vessels which had come from Hamburg; but it was not till the month of July, 1849, that the cholera appeared in Hull as an epidemic.

While in Hull the attention of Mr. Grainger and myself was drawn to the injurious effects of the quarantine which had been imposed on vessels arriving from affected ports. We found that actually no provision had been contemplated for the discovery and treatment of premonitory cases occurring on board such vessels, and that it was only after the disease had gone on to developed cholera that assistance would have been sent for, while the distance of the quarantine-ground from the town would have almost certainly insured the death of every individual attacked, on account of the long delay which must have taken place before medical aid could be obtained. It is one of the absurdities of the system of quarantine, when applied to cholera, that it is directed against the introduction of a disease presumed to be contagious, and which experience has proved cannot become epidemic unless certain conditions prevail, which must be existing for some time before any case of the disease can occur. The whole mischief is, in fact, done quietly and unobtrusively before any alarm can be taken. It is also one of the inevitable dangers of the system, that human life must be sacrificed in the vain attempt to realize an impossible result. I look upon the evidence of the non-contagious nature of cholera, and of its dependence upon an epidemic constitution and suitable localizing circumstances in the population, as afforded by the whole history of the disease in Hull, to be perfectly conclusive.

2.—Overcrowding, defective Ventilation, &c.

In the beginning of November, 1849, cholera visited the town of Taunton, under such circumstances as to afford valuable experience in regard to the effect of specific localising causes. Though requiring improvement, the town itself was generally in a much better state than others which had been attacked by the disease. At one extremity of

Taunton is situated the workhouse, and at the other the county prison, the sanitary conditions of which differed most materially from each other. The whole population of the town does not much exceed 16,000, and from its small size we have the best possible means of judging of the effect of the epidemic influence upon three classes of people, the inhabitants of the town, the inmates of the workhouse, and the prisoners within the walls of the gaol. From the absence of any marked localising cause, the population generally was not greatly predisposed to attacks of the disease, and the only result was the occurrence of cases of diarrhœa.

Very different was the fate of the inmates of the workhouse, the arrangements of which were such as could not fail to be productive of disease. The situation occupied by the building was badly drained, the refuse being carried by a sewer to a cesspool in the garden, which was uncovered till a short period before the attack of cholera began. The house is remarkably low, and consists of a front building, with branches or rays, which project into the yard behind. This yard is surrounded by low badly constructed sheds, which were used partly as offices, partly for wards; and in one of them is situated the girls' and infants' schools belonging to the establishment. The internal arrangements of the house are exceedingly defective. Its passages and staircases are not constructed so as to facilitate ventilation. The ceilings of the wards are not nearly high enough for safety, being generally not more than 8 feet 9 inches in height. The water-closets opened into the wards or staircases, and in the sick ward this convenience formed part of the ward itself. The building was intended to accommodate 410 inmates, and there were 276 within its walls when the disease broke out. The ventilation of the wards was very bad, and the population overcrowded, notwithstanding that the numbers were so much reduced.

Mr. Foster, the medical officer of the establishment, gives the following evidence as to the result of this state of things:—

“On visiting the wards at night has found them close and offensive, and has repeatedly complained of the windows being shut. The ventilation is bad. Considers that, even with the reduced population which existed in the wards lately, the space was not above two-thirds of what was requisite for safety. . . . The house is liable to offensive smells from the water-closets, especially in the sick ward. It has been represented to the guardians; but nothing has been done. . . . Considers the present sick wards as not at all fit for sick, more especially for pulmonary disease, the windows opening immediately over the heads of the beds.”

The greatest degree of overcrowding existed in the girls' school-room, which was a slated shed, 50 feet long, 9 feet 10 inches broad, and 7 feet 9 inches high to the top of the walls, over which was a sloping roof. In this miserable place were huddled together 67 children, with about 68 cubic feet of air to each. The infant-school, which was situated under the same roof, was only fit for a coal-cellar.

The means and appliances of personal cleanliness within the workhouse were defective. Mr. Foster says,—

“The people are generally of dirty habits, and cannot be kept clean. There are no washhand-basins for the inmates. There are none in the sick wards to my knowledge. Has often seen the sick washing themselves in chamber-pots. The paupers wash in a long trough.”

12 *Fatal effects of Overcrowding and defective Ventilation.*

The result of these causes in predisposing to disease is fully exemplified by the following evidence given by Mr. Foster. He says,—

“The union house is very subject to epidemics, to measles, scarlet fever, typhus, diarrhœa constant, especially in children, dysentery, scurvy. . . . So far as I know, no child dry-nursed has been raised beyond 4 years of age; and the only child which attained that age has died of cholera.”

The following table exhibits the proportion of deaths to the inmates for a series of years; and, granting that a large proportion of these may occur in persons who enter the house in a sickly state, there can be no doubt that it exhibits an excessive mortality:—

Table of Annual Mortality in Taunton Union Workhouse.

Years.	Average Inmates.	Deaths.
1842-43	322	44
1843-44	293	39
1844-45	305	41
1845-46	280	33
1846-47	306	56
1847-48	343	60
1848-49	361	72

About two months before cholera appeared, bilious diarrhœa prevailed in the workhouse. Early in October it began to advance, and a man died of dysentery. The first case of cholera occurred on the 3rd of November, and in ten minutes from the time of seizure the sufferer passed into a state of hopeless collapse. Up to 4 P.M. of the 5th of November, no fewer than 42 cases and 19 deaths had taken place; and in the course of one short week 60 of the inmates were swept away.

The girls' school-room, which was by far the most unhealthy part of the building, furnished the largest proportion of victims. The total number of children in this shed before cholera appeared was, as has been stated, 67. Of these, three were removed the moment the disease broke out, and one of them was attacked, but recovered. 33 out of the remaining 64 were seized, 25 died, and only 8 recovered. The 31 who escaped were removed, partly to a large airy schoolhouse in the neighbourhood, and partly by parents and friends to different places. Of the 15 taken to the school-house, 12 were suffering from diarrhœa; but by constant care, and a complete change of food, procured, not from the union house, but from the town, all recovered. A curious circumstance occurred with respect to the boys' school. This apartment was rather worse than that of the girls; but the boys, who were good and obedient in other respects, could not be kept from breaking the windows. In the girls' school the windows were never broken; and Mr. Smith, the chaplain of the workhouse, states his firm belief, that it was to the better ventilation, which the broken windows maintained in the boys' school, that the children in some measure owed their lives.

The following are the statistics of the mortality from cholera:—

Girls' school	25
Boys' school, including master . .	10
Men from 16 to 60 years of age . .	9
Women do. do.	9
Men above 60	4
Women do.	2
Infants	1

Total . 60

Let us next contrast the position of the county gaol with respect to the prevailing epidemic. I found the cells occupied by the prisoners in the new part of the building had the following dimensions:—

Height	9 ft.
Length	13
Breadth	7
Superficial area	91
Cubic contents for one prisoner . .	819 cubic feet.

The cells in the other parts of the building had the following dimensions:—

Length	10 ft. 6 in.
Breadth	8 6
Height	8 6
Superficial area	89 3
Cubic contents for each prisoner . .	935 cubic feet.

There is a corridor having a common ventilation with 71 cells. It is 30 feet high, 100 feet long, 12 feet broad, and has 36,000 cubic feet of contents. A system of ventilation passes through every cell, and a temperature is maintained that hardly varies three degrees in 24 hours. Each prisoner has the means of personal cleanliness. He has a water-closet, washhand-basin, and unlimited water-supply. He has a good diet, and cleanliness is strictly enforced throughout the building. The following table of the usual health of the prisoners, put in evidence by the governor, Mr. Gane, will show the result of these excellent arrangements:—

Table of Sickness and Mortality in the County Gaol, Taunton.

Years.	Prisoners.	Infirmary Cases.	Deaths.
1842	840	60	3
1843	1026	60	2
1844	1122	35	1
1845	959	46	1
1846	821	25	1
1847	973	18	1*
1848	1199	33	2

During the presence of the epidemic in Taunton, not a solitary case either of cholera or diarrhœa occurred among the prisoners in the gaol.

Opportunities rarely offer, such as those afforded by the instance before us, of testing the truth of the principles of preventive science. There were three classes of persons living under different circumstances.

1st. Those within the walls of the gaol, who, although in confinement, were surrounded by the appliances of health.

2nd. The population of the town, many of whom inhabit dwellings whose sanitary condition is by no means so good as that of the prison.

3rd. The unfortunate inmates of the workhouse, who were exposed to almost every conceivable disadvantage in regard to health.

The results were, perfect safety to the first from the lightest touch of the epidemic; the townspeople escaped with some cases of diarrhœa, but without a solitary instance of cholera; while out of 276 inmates of the workhouse, no fewer than 60, or nearly 22 per cent., died of cholera within a single week, and nearly all the survivors suffered to a greater or less extent from cholera or diarrhœa.

3.—*Unwholesome Water.*

I have frequently had occasion to refer to the very injurious effects resulting from the use of impure water during the late epidemic. In nearly every city or town affected this element has been more or less prominent, and a number of most severe and fatal outbursts of cholera were referable to no other cause except the state of the water-supply. Such has especially been the case when the water was obtained from wells into which the contents of sewers or privies, or the drainage of graveyards, had escaped. The predisposition occasioned by the continued use of such water is perhaps the most fatal of all; and the proportion of deaths to attacks has generally been much greater in epidemic seizures resulting from it than from any other predisposing cause.

The water has at times been most offensive to the smell; but occasionally the only apparent impurity has been a little muddiness. I have known water pronounced to be, chemically, wholesome, occasion the death of a large number of persons, although I never met with an instance in which the microscope did not detect the presence of a considerable amount of organic matter.

I select the following illustration out of a number, because it is accompanied with statistical data:—

While cholera was prevailing in Manchester, a sudden and violent outbreak of the disease took place in Hope-street, Salford, apparently connected with the use of water from a particular pump-well. As some difference of opinion had arisen on the subject, I procured samples of the water, which were slightly muddy in appearance, and, when examined under the microscope, gave the usual indications of the presence of organic matter. I then obtained the statistics of the streets where the water was used from Mr. Currie, one of the acting medical officers of the union. The houses were found to be supplied from a variety of wells, and also from the pipe-supply. The table on next page gives the result of the inquiry, and the number of epidemic cases. Wherever the source of the water-supply is not stated, it may be considered as good; and where it is designated as "pump-water," the people had used the water complained of.

Table of Houses in Hope-street, Salford, showing the effect of Impure Water in predisposing to attacks of Cholera.

(East side of Street.)

No. of House.	Source of Supply.	Diarrhœa Cases.	Cholera Cases.	Deaths from Cholera.
No. 2 to 13 . . .	..	..	..	..
„ 14	Pump-water . . .	..	1	1
„ 16 . . . . .	..	..	..	..
„ 18	Pump-water . . .	..	1	1
„ 20 to 32 . . .	..	..	..	..
„ 34	Pump-water . . .	..	2	2
„ 36 to 38 . . .	..	..	..	..
Cellar	Pump-water . . .	..	2	1
No. 40 to 42 . . .	..	..	..	..
Derbyshire-court . . .	..	1	..	..
No. 3, Swann's-court . . .	..	..	..	..
„ 4	Pump-water occasionally	1	..	..
„ 5 . . . . .	..	..	..	..
„ 6	Pump-water . . .	..	1	1
„ 8 to 10 . . . .	..	..	..	..
„ 11	Pump-water . . .	2	..	..
„ 13 . . . . .	..	4	..	..
„ 16 . . . . .	..	..	..	..

(West side of Street.)

No. 3 . . . . .	..	..	..	..
„ 5	Pump-water . . .	1	..	..
„ 7 . . . . .	..	3	..	..
„ 9 to 13 . . . .	..	..	..	..
„ 15	Pump-water . . .	2	..	..
„ 17 . . . . .	..	3	..	..
„ 19	Pump-water . . .	1	3	3
„ 21 . . . . .	..	..	..	..
„ 23	Pump-water . . .	..	1	1
„ 25	Ditto	1	1	1
„ 27	Ditto	2	..	..
„ 29 . . . . .	..	..	..	..
„ 31	Pump-water . . .	1	..	..
„ 33	Ditto . . . . .	..	1	1
„ 35	Ditto	1	..	..
„ 37	Ditto . . . . .	..	3	3
„ 39	Ditto	4	..	..
„ 41	Ditto . . . . .	..	1	1
„ 43	Ditto	1	..	..
„ 45	Ditto occasionally . . .	2	..	..
„ 47	Pump-water . . .	..	1	1
„ 49 to 55 . . . .	..	..	..	..

Muslin-street to
Christ Church-street.

No. 4	Pump-water . . .	..	..	..
Heap's-court . . .	Ditto . . . . .	..	4	4
Pump-court . . .	Ditto . . . . .	..	3	3
Cow-lane	Ditto . . . . .	..	1	1

Several houses were
shut up.

GENERAL RESULTS.

		Total Diarrhœa Cases.	Total Cholera Cases.	Total Deaths.
Number of houses using } water from the pump . }	30	19	26	25
Number of houses using } other water . . . }	60	11	None.	None.

The following are specimens of the complaints made against the water by the people in the neighbourhood:—

“The water looks rather muddy, and has not been clean since the pump was mended.”

“Dreadful heavy dirty water-settlings from a canfull.”

“Has seen the sludge boil like barm at top, and it left something on the pan like soapsuds. The week we began to use the pump-water the man died.”

John Holding states that he was stopped from using a pure well-water, and was obliged to use the pump-water. On Saturday, Sept. 29, he “Got two cans of water from Pump-court.” “A lodger was seized with cholera on Monday, and died next day.”

Another complainant states—

“That he was afraid of using the pump-water, on account of the water in which the bedding of two persons who had died of cholera had been washed having been thrown into the gutter, and he thought it ran into the well.”

It appears that the well had been repaired, and, from some cause or other, a sewer which passes within 9 inches of the edge of it had become obstructed and leaked into the well.

The statistical evidence given in the preceding page affords a melancholy and convincing proof of the enormous destruction of human life which may ensue from a very slight degree of negligence or accident.

4.—*Injurious effect of Town Refuse.*

The advocates of sanitary improvement have long asserted that the exhalations from town refuse have a direct effect in lowering the standard of the public health, in predisposing to epidemic attacks, and to the slower but no less certainly fatal operation of other diseased conditions. We should expect, therefore, that persons living close to accumulations of such refuse would suffer severely, especially if an epidemic happened to touch the neighbourhood.

To illustrate this fact, and at the same time to demonstrate the extreme importance of the sanitary principles involved in the cleansing operations so strenuously, and in some instances so fruitlessly, put forward by the General Board of Health in its Regulations and Notifications, I shall select one very melancholy and striking instance of the fatal results arising from the neglect of its orders in this particular:—

On the east side of the town of Hull lies a suburb called Witham, in which there is a triangular space of ground bounded by the street called Witham, Great Union-street, and Church-street. This triangle is surrounded by houses, so as to leave an open space in the centre of nearly

APPENDIX (A)

TO THE

REPORT OF THE GENERAL BOARD OF HEALTH

ON THE

EPIDEMIC CHOLERA

OF

1848 & 1849.

REPORT BY DR. SUTHERLAND.

Presented to both Houses of Parliament by Command of Her Majesty.



LONDON:

PRINTED BY W. CLOWES & SONS, STAMFORD STREET,
FOR HER MAJESTY'S STATIONERY OFFICE.

1850.

CONTENTS.

	PAGE
REPORT on the Epidemic Cholera of 1848-49	1
Districts under Inspection	2
Localizing Causes of Cholera	3
Signs of an Epidemic Constitution	4
Epidemics haunt the same Localities	5
Marks of developed Cholera	6
Localizing Causes of Cholera	7
Illustrations of localizing Causes of Cholera—Errors of Diet	8, 9
Fatal results of Overcrowding and defective Ventilation	10, 11
Cholera in Taunton Union Workhouse	12, 13
Predisposing effects of bad Water Supply	14, 15
Fatal effects of Emanations from Town Refuse	16, 17
Predisposing effects of Dampness	18-20
Sanitary Evils from defective Structure of large Tenements	21
Greater liability of top Flats to Cholera	22
Outbreak of Cholera in Redcross-street, Bristol	23, 24
Fatal results of defective Sanitary Improvements	25, 26
Effects of overcrowded Graveyards	27-29
Effects of Malaria in producing attacks of Cholera	30, 31
Fatal effects of intemperate Habits during Epidemics	32
Fatal effects of Fatigue	33
Abstract of localizing Causes of Cholera	34-40
Localizing Causes removable	41, 42
Places of Refuge	43, 44
Premonitory Stage of Cholera	45, 46
Identity of Cholera in its progressive Stages	47, 48
Necessity of checking the earlier Stages	49
Apathy produced by the poison of Cholera	50
Necessity of House-to-house Visitation	51
Medical House-to-house Visitation	52
Organization of House-to-house Visitation	53
Medical Visitation first adopted in Dumfries	54
Striking results of Medical Visitation	55, 56
Reports on Cholera in Dumfries	57-69
Report on Cholera in Glasgow	70-86
,, Manchester	87-100
,, Hull	101-106
,, Sheffield	107-110
Abstract of Reports on Cholera in Liverpool	111-113
,, ,, Wolverhampton	114
,, ,, Dundee	115-117
,, ,, Hamilton	118
,, ,, Glengarnock Iron-works. Coatbridge	119
,, ,, Carnbroe	120
,, ,, Leeds	121

	PAGE
Abstract of Reports on Cholera in Sunderland	122
" " Edinburgh	123, 124
" " Bristol	125, 126
Advantages of Home Treatment of Cholera	127
Statistics of Home and Hospital Treatment	128
Necessity of Home Treatment of Cholera	129
Early Interment of the Dead	130, 131
Necessity of intermediate Reception Houses	132, 133
Execution of Regulations	134
Defective administration of preparatory Measures	135
Regulations for medical Relief	136
Defects in Legislative Provisions	137, 138
Loss of Life from the nature of the Authority	139
Cholera on board the "American Eagle"	140-145
Conclusions	146-149

APPENDIX:—

Table I. Daily Table of Premonitory Cases and Cholera in Glasgow	151-153
Table II. Aggregate Returns for each District in Glasgow	154
Table III. Daily Ratios of Premonitory Cases to Cholera in Glasgow	155
Table IV. Statistics of Cholera in Parkhead	156
Table V. Statistics of Cholera in Hull	157
Table VI. Statistics of Cholera in Manchester	159
Table VII. Statistics of Cholera in Districts of Manchester	160
Table VIII. Statistics of Cholera in Paisley and Charleston	160
Table IX. Statistics of Cholera in Bristol	162
Duties of Medical Officers, &c., in Dumfries	163
Instructions to Medical Officers in Glasgow	164

three acres in extent, about two acres of which is used as a place of deposit for part of the night-soil of the town and other manure, which is interspersed in heaps among the houses, and close to the doors of dwellings. These noxious matters are collected by a number of persons who make a trade of accumulating and selling them for agricultural purposes, and they have become so accustomed to live amongst this horrible garbage, that they not only heap it up against the walls and immediately under the windows of their houses, but it is stated that they have come to consider the atmosphere of the locality "rather wholesome and agreeable than otherwise."

In the month of July, 1849, I went over the neighbourhood, and certainly few places have presented more elements of disease and mortality. The surface appeared to be one mass of heaped up filth. An offensive open ditch ran through the ground, and the whole atmosphere was sensibly polluted to some distance. Mr. Chatham, clerk to the Guardians of Sculcoates Union, in which Witham is situated, states in a published letter, that from an examination of the registers of deaths for the district, he found "that although the average age of all persons who die in other parts of the town is 23 years, the average age of all persons dying in Witham and Drypool is only 18." This fact, at all events, affords one indication of great local unhealthiness.

At the time I made the inspection, there was no cholera in the district, or near it, but in addition to pointing out these collections of filth as requiring immediate attention, I deemed it to be my duty to address a written protest to the Board of Guardians against a state of matters which ought not to have been permitted to exist after the issuing of the regulations of the General Board of Health nine months before. There is every reason to believe that had these nuisances been summarily dealt with when the first warning was given to the town in September, 1848, a great part, if not the whole of the appalling catastrophe which took place might have been averted. In the letter referred to I used the following words:—"In the whole course of a pretty extensive experience, it has never been my lot to be brought in contact with a state of things altogether so abominable, or considering the present state of the public health, so dangerous." Most fearfully was the prediction realized. Nothing effectual was done: indeed, I question whether in the pressing emergency which followed much good in the way of protection could have been accomplished. The real time for preparation had been allowed to pass over. The epidemic at last touched the district and committed the most fearful ravages among the people. In Mr. Chatham's published letter already quoted, he says briefly, "I am enabled to prove, from the records in my possession, the truth of his (Dr. Sutherland's) assertion. In fact, the deaths occurring from cholera in the streets surrounding the muck garths in Witham were upwards of 80—a greater proportion, considering the area and population, than in any other part of the town."

A plan of the neighbourhood will be found in plate 1 (see Report, p. 45), showing the localities of *ninety-one* deaths from cholera, the actual number of persons who were swept away by the pestilence on the outskirts of a triangular space measuring little more than 200 yards on the side. I have never known an open neighbourhood of this size yield so large a number of deaths. To get the number of attacks we must nearly double the number of deaths, if the proportions held good here as elsewhere:

and although no human words can express the domestic misery that has been occasioned, it will require very little arithmetic to calculate the pecuniary loss which has been entailed on the community, by permitting a few petty private interests to stand in the way of the public safety.

The Sculcoates Guardians were latterly very active in prosecuting offenders, but Mr. Chatham's letter states that "after upwards of 100 convictions under the Nuisances Removal Act, the Guardians have only applied for their enforcement against one person, and the application for distress warrants in that case was, as the public are well aware, refused." So much for the value placed on the lives of the people by those whose duty it was in law to protect them !

5.—*Dampness in the Subsoil.*

A very frequent cause of the localization of cholera is dampness in the atmosphere, especially such as proceeds from the proximity of river-banks, and the presence of water in the subsoil on which the houses are built. One or other of these causes is present in a great majority of instances, but the effect of a wet subsoil and certain of the conditions from which it arises, have not hitherto attracted that degree of attention which their importance merits.

At first sight it might appear that houses built on hill-sides, at a considerable elevation above the neighbouring low ground, ought to be exempt from the attacks of epidemic disease. Their airy exposed situation, and great apparent facilities for drainage, might be supposed to render them specially conducive to health, but such is by no means a necessary consequence of the simple accident of elevated position. It has been considered a mark of the peculiarly capricious and erratic nature of cholera, that it has sometimes attacked lofty situations, while it has left the neighbouring valleys untouched. During the late epidemic several examples occurred of extremely violent outbreaks in towns, and even in individual houses built on the sloping sides of hills. I might instance the cases of Hamilton in Lanarkshire, Maxwelltown in Dumfriesshire, and Dowlais in South Wales, with a number of other places similarly situated.

The reason of this predisposition will be easily understood by an individual illustration. The one I shall select is that of the village of Spring Bank, which may be considered as the epidemic centre of Glasgow. This case is especially illustrative, because there is a head of water in the Forth and Clyde Canal, not many yards from, but considerably above the level of the foundations of, the houses. The pressure of the water keeps the hill-side in a state of perpetual dampness, and the water collects in any hollows which may exist in the ground. The consequence is, that the atmosphere is moist both within and without the houses.

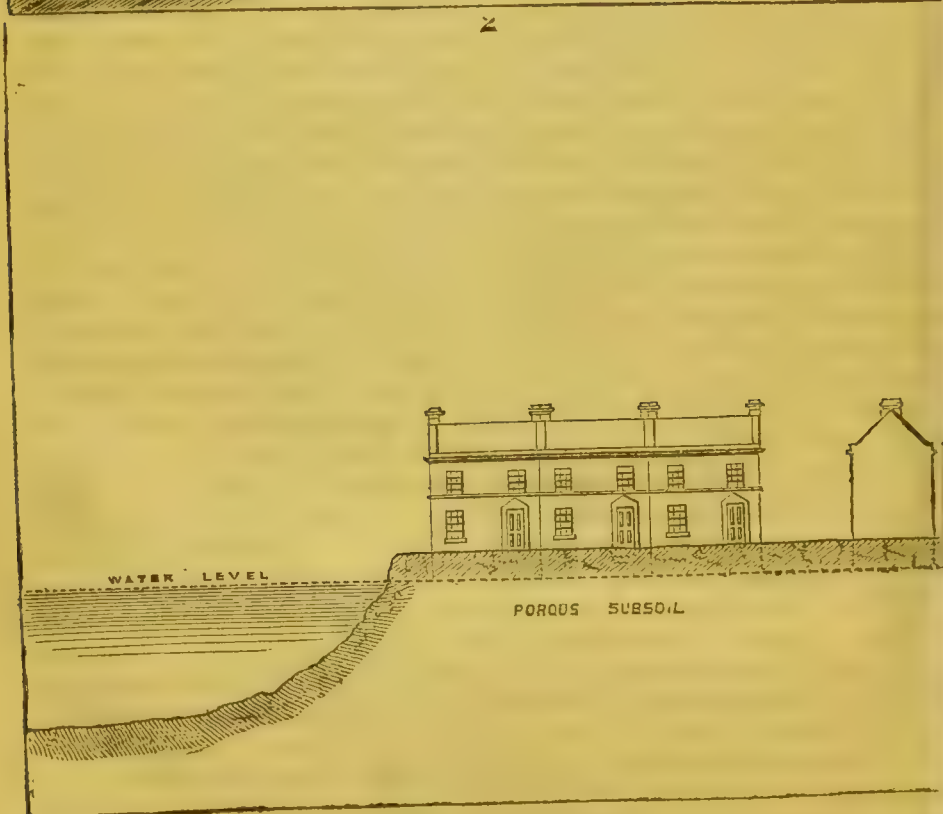
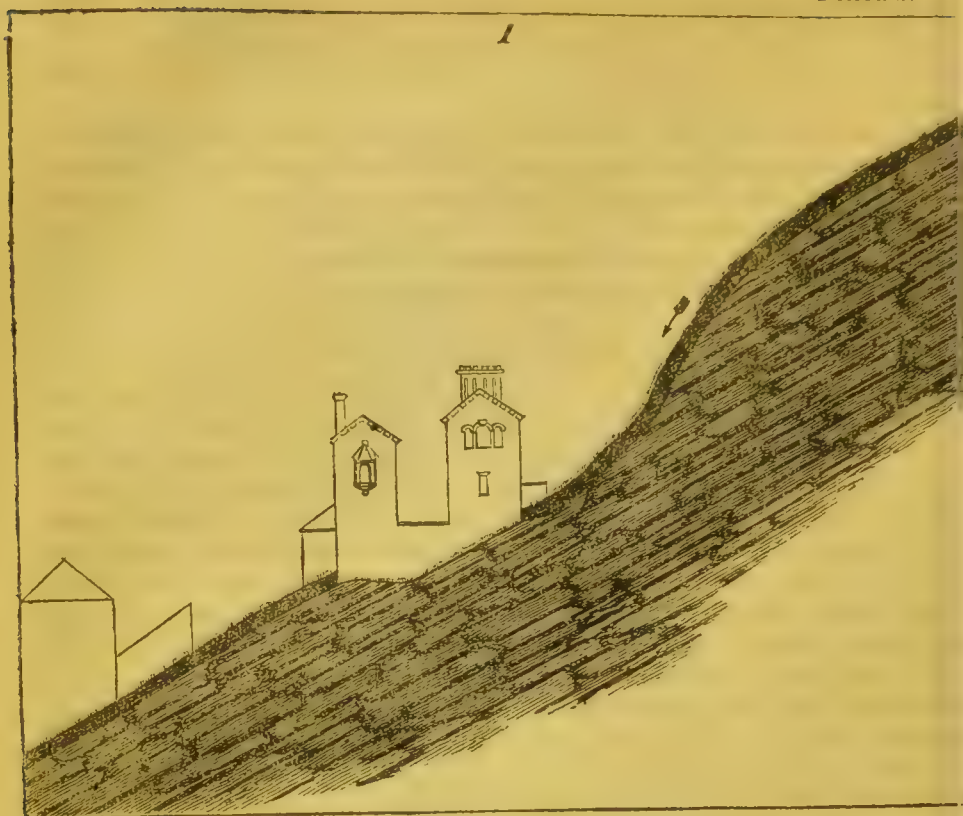
In other instances a similar effect is produced by the lateral exudation of moisture from slopes of hills proceeding from the natural drainage, the usual rainfall in its passage from the surface of the hill to the low ground appearing at various points on the hill-side. It must be obvious that, if a street of houses be built across the natural course of the drainage, the foundations will obstruct the downward flow of the water, and accumulate it in the ground immediately behind the houses. In one such instance a stream of water actually percolated the back wall of a cottage from the slope above, and escaped upon the public road after passing through the house. This dwelling was attacked with cholera.

The evils described are greatly aggravated if pigsties, manure-heaps, or other nuisances, are placed higher than the houses, especially if the ground be at all of a porous nature. In such cases the lateral drainage becomes polluted with organic matters.

Even surface-drainage, as at present carried out, flowing from the higher to the lower parts of towns, at times produces much mischief. Such an instance occurred when cholera was prevalent in Edinburgh. The disease carried off four or five individuals in a single house, fronting the open country, at the foot of one of the closes in the Canongate. There was not a single case of cholera in the neighbourhood except these, and the house was perfectly clean, and the locality well ventilated. The catastrophe arose as follows:—The drainage of the High-street and Canongate takes place on the surface, and is continually impregnated with night-soil and other impurities. In passing the mouth of the close in question, from some defect in the gutter, part of the drainage was turned aside and ran down the close. There was no escape for it at the lower end, where it accumulated and became extremely offensive. Only two or three families were exposed to the effluvia, and one of them was almost entirely destroyed. The cause was then recognised and removed. I cite these facts as affording individual illustrations of a class of causes which operate in rendering localities unhealthy which otherwise should not be so. Houses and towns built on hill-slopes evidently require sanitary precautions of a particular kind, and proper means should be taken to cut off the natural drainage from the site chosen, and to divert it in such a way as to render it innocuous.

Much of the evil resulting from the close proximity of rivers and canals proceeds from lateral infiltration of the subsoil, and not merely from the aqueous vapour which rises from the surface of the water itself. In the village of Spring Bank already referred to, many of the houses most severely attacked by cholera had their floors nearly on a level with the canal. A small house in which the first cases occurred is thus situated. It contained two inhabitants, both of whom died, and there was no other appreciable reason for the attack.

The epidemic seizure of the lower part of Inverness in April, 1849, affords another similar illustration. The site occupied by the houses is a flat gravelly piece of ground on the banks of the river Ness, and the foundations are rather below high-water mark. The whole of this gravelly subsoil receives the brackish water of the river, which can be obtained by digging a few feet below the surface. The natural disadvantages of such situations are greatly aggravated by improper attempts at sewerage, especially where there are tidal rivers such as the Thames. Besides the evils resulting from imperfect declivity, the sewers are back-watered at high tide, and actually become the means of distributing a polluted and unwholesome drainage through all their ramifications, by which the whole subsoil becomes infiltrated with impurities, the atmosphere rendered noxious by exhalations forced up from the sewers, and the public health endangered. To such causes must be attributed not a little of the fatal outbreak of cholera which occasioned such devastation in the southern portion of the metropolis during the late epidemic. I feel convinced that all attempts at intermittent drainage in these localities would only increase the evil, and that the mischievous results of such a system would be speedily manifested. It would be safer to



Origin of Damp Subsoil.

leave similar districts wholly unsewered than to adopt any method which would not secure the removal of the drainage as rapidly as it was formed. The accompanying sketches will render these two causes of dampness easily intelligible. (Plate 2.)

No. 1 shows a section of a row of houses built on a hill-slope, across the natural course of the drainage, which is interrupted both by the cutting across of the strata, and by the obstruction which the houses offer to the surface-drainage.

No. 2 shows the lateral infiltration of water from rivers and canals under the foundations of houses built on their banks.

6.—Defects in the Internal Economy of large Tenements.

There are certain peculiarities of structure in the houses of the older parts of Edinburgh and Glasgow which in my opinion have a powerful tendency to predispose their inhabitants to epidemic disease; and as these causes have not hitherto been brought forward prominently, I shall briefly describe them, and point out their effects during the late visitation of cholera. It is commonly believed that the chief causes of sickness are connected with the condition of the surface or subsoil of a town; but in the Scotch cities it is found that a great deal of epidemic disease occurs at the top of the loftiest tenements, where a comparatively pure atmosphere surrounds the dwellings. In order to elucidate this fact, it will be necessary to inquire into the internal arrangements of these buildings. The perishable nature of the structures in many of the English towns renders a complete reconstruction possible within comparatively short intervals of time, and a progressive improvement and amelioration can thus be effected. Such, however, is not the case in Edinburgh and Glasgow, very many of the houses of which have been inhabited for centuries, and to all appearances will last for centuries to come. Ancient mediæval structures, after having served as mansions during feudal times, have been divided and subdivided to suit the necessities of a new class of occupants, with little regard to the best methods of effecting the change, and with an utter forgetfulness of the comfort, health, and convenience of the tenants. Houses with eight or ten successive nests of families, piled one above the other, are by no means uncommon. Such tenements are hardly suitable for the purposes of modern civilization, and they can only be occupied without absolute danger to the health and morals of the inmates by a strict application of those resources which science has brought to bear on the social welfare of the people. The "lands," as they are called, have generally one common stair to give access to their teeming population, a circumstance which must always render a thorough cleanliness of these approaches next to impossible. Many of the stairs and the passages which branch off from them are dark and noisome; and from the absence of all domestic conveniences in the houses, they become depositories of filth of the most disgusting kind. The atmosphere in them is most impure, and often extremely offensive; and as the houses must be supplied with air through these channels, we need not be surprised to find that the supply is at times almost intolerable. The same want of conveniences leads to a most abominable state of the closes, which all police regulations have hitherto failed to improve materially, especially in Edinburgh, so that the ordinary channels through which the atmosphere reaches the inmates, even in the loftiest

and apparently best ventilated parts of the old town of Edinburgh, are impregnated with impurities, dissolved and carried along by the air.

There is no household water-supply to this class of tenements either in Edinburgh or Glasgow. The small quantity made use of is procured from public wells, or stand-pipes in the streets or closes, and has to be carried to considerable altitudes, so that the amount of labour required is a direct inducement to use as little water as possible. Were the whole *requisite* supply procured in this way, it would entail on each family the transport of between two and three hundredweight of water a-day to the height of 60 or 80 feet. There are no means provided by which the solid and fluid egesta of the households can be removed, except by the laborious process of carrying down the whole weight which had previously been carried up. There are neither water-closets, sinks,* nor dust-shoots, and the result of the want of these most needful conveniences is, that all the offensive refuse of the house must be retained within inhabited apartments, and in immediate proximity to the scanty water-supply. The atmosphere is rendered damp and foul by the exhalations, and the water unwholesome by absorbing them. It is true that the police send round carts for removing the refuse; but under the best possible arrangements of this kind, the house refuse must still be retained sufficiently long to be injurious, while the inmates not unfrequently find themselves inconvenienced by the operation of conveying it down from such an altitude at the precise moment fixed by the police for its removal. The practical result is, that it is often retained as long as possible, or thrown out of the windows into the closes below. It is even not a rare occurrence to find large accumulations of decomposing matter, which appear to have lain for years, in garrets and empty apartments of these lofty houses.

These circumstances fully explain the reason why large tenements are so liable to epidemic disease, apart from considerations of drainage or surface-cleansing; but there is yet another element of unhealthiness in the overcrowded population which inhabits them, and in the entire absence of any means of ventilation. Where there are a large number of families there must be a corresponding number of fires burning at all seasons, so that the temperature of the whole internal atmosphere is higher than of that without. There is a constant tendency of this warm impure air to ascend toward the higher flats by the staircases, through crevices in the ceilings, and even through the floor and plaster, both of which are porous. If what has been already stated as to these peculiar causes of disease be correct, we should naturally look for marked effects of an epidemic in the upper flats. I had been several times so forcibly struck with the occurrence of epidemic disease in the loftiest parts of Edinburgh, that, when cholera appeared in Glasgow, I requested the district superintendents of the city parish to keep records of the precise flats in which the cases occurred, and the results of this classification have confirmed the views above stated in a most remarkable manner. The houses in Glasgow, of which the statistics were kept, have rarely a sunk flat. There are generally two or three middle flats, that is, those comprehended between the ground-floor and the top flat. An account of the precise localities of 1106 cholera cases was kept, and the following is the result:—

* There is a very unwholesome substitute for sinks in some portions of Glasgow.

Proportion of Flats affected with Cholera in Glasgow.

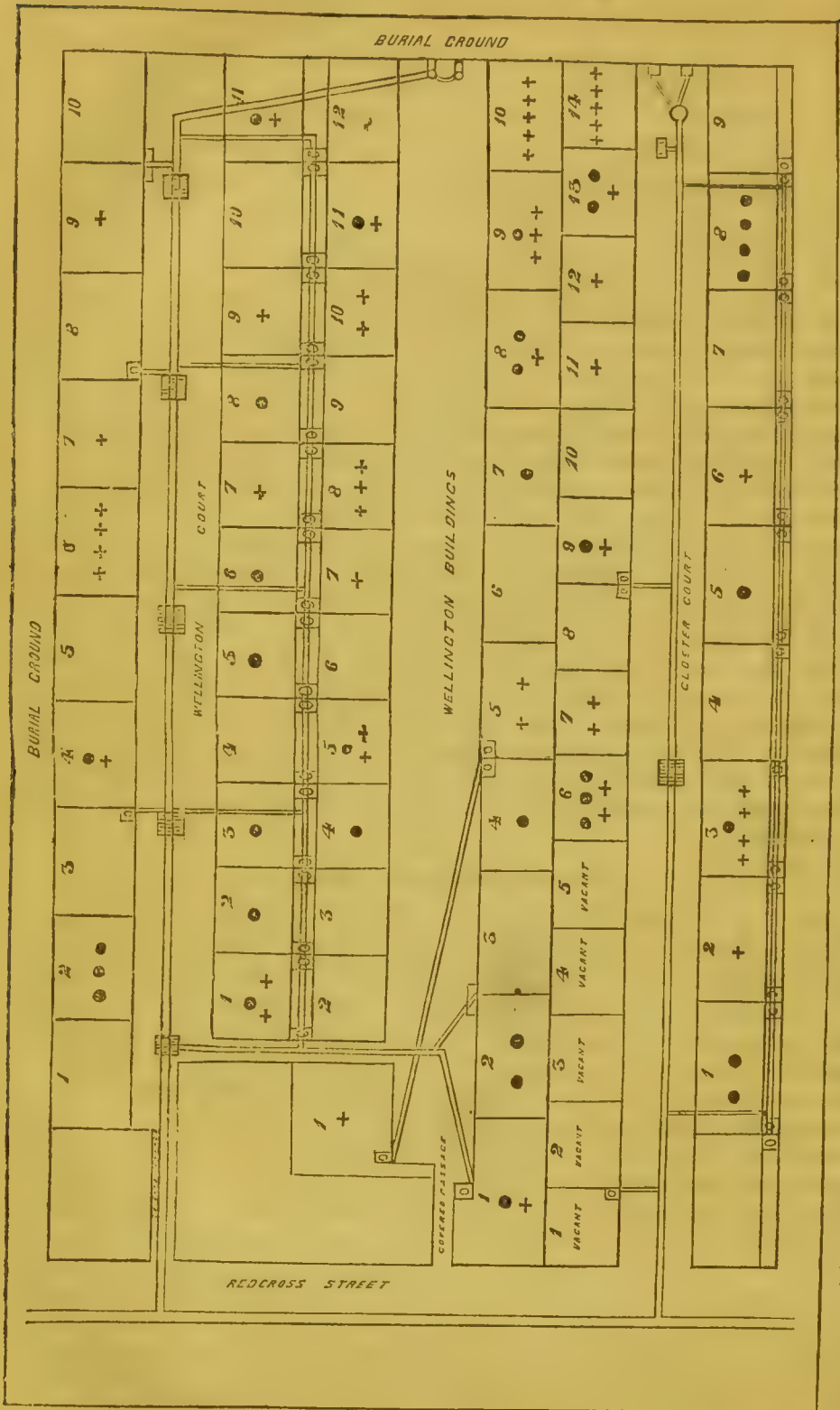
Flats.	Cholera Cases.	Percentages.
Sunk flats	29	2·61
Ground flats	311	28·1
Middle flats, two or three in } number in each tenement . . }	408	36·89
Top flats	358	32·37

If the percentages of cases occurring in the middle flats were divided among them, it would give to the top flats a proportion of epidemic cases from 2 to $2\frac{1}{2}$ times as great as that belonging to each of the middle flats. The latter are also by far the most populous. The sunk flats are too few in number to give a result; but the relative unhealthiness of different stories stands as follows:—The middle floors are the most healthy, as being equally removed from the effects of the upward drainage of the foul and unwholesome internal atmosphere, and the offensive exhalations from the uncleansed and undrained streets below. From their greater proximity to the latter cause of disease, the ground flats rank next in unhealthiness; while the top flats from becoming, as it were, cesspools for the ærial drainage of all the stories below, were found to be by far the most liable to attacks of epidemic cholera. The result is very striking, and points to the existence of causes of epidemic disease in the Scottish cities which have hitherto attracted too little attention. They are the same in character, but far more aggravated in degree than those which have been observed to exist in the upper flats of unventilated cottages and workshops by Mr. Chadwick and other observers.

7.—Defective Sanitary Alterations, &c.

The first outburst of cholera in the city of Bristol took place in three courts in Red Cross-street, known by the names of Wellington-court, Wellington-buildings, and Gloucester-court, which cover a piece of land 56 yards in length by 37 in breadth. This measurement includes the houses in Red Cross-street, so that the actual area covered by the courts is about 1850 square yards. On this oblong piece of land are 6 rows of houses built back to back, making in all 66 dwellings. An overcrowded graveyard extends along two sides of the ground, and on the other two sides it is shut in by buildings, and two out of the three courts are entered from Red Cross-street by narrow covered passages about 10 yards in length, the third court being open. Were there no other unfavourable circumstance than the position which these courts occupy, it would be sufficient to account for their unhealthiness, the only ventilation they receive being from the adjacent burial-ground, the drainage from which no doubt also exercises a most injurious influence on the neighbourhood. The houses are very small, and when the disease broke out they were crowded with people. The supply of water was deficient and impure, and was derived for all the three courts from one pump in Wellington-court, into which there had been an escape of drainage, either from the sewer of the court, which passed

PLATE 3.



Plan of Courts in Red-Cross-street, Bristol, showing the position of the privies, drains, gully holes, and burial-ground. The deaths from Cholera are marked by black discs, the recoveries by crosses.

close to it, or from the burial-ground. A sewer runs through Red Cross-street, which is connected with two drains in Wellington-court and Gloucester-court; but there being no fall to carry off the drainage, the court drains were constantly full of the refuse of the privies. These drains are in fact the cesspools of all the houses, and they communicate directly with the surface of the courts by a large number of ill-trapped gully-grates, the effluvia from which are at times most horrible. The people were obliged to cover the gratings with canvas pressed down by a weight.

The position and construction of the privies require also to be noticed. On one side of Wellington-court there are two in the houses, and one in the court itself. On the opposite side there are 11 houses, corresponding to the same number in the next court, called Wellington-buildings. Between these two rows of houses there is a narrow space, which contains the privies belonging to both. The privies in Wellington-buildings are placed some of them behind the houses, some within the houses, and some in the courts. In Gloucester-court there are two privies in the court, and three in the houses on the left-hand side. Behind the houses on the right-hand side there are 18 privies belonging to them and to the dwellings of the adjoining street. Many of the privies are badly constructed, and allow the percolation of soil through the masonry. These conveniences communicate directly with the court drains by branch drains passing underneath the floors of some of the houses, and were either not trapped at all, or so inefficiently done as to afford no obstacle to the escape of the poisonous effluvia which filled the interspaces between the houses, and found a ready entrance at all times into them by means of the back doors. The extent of these evils will be better understood from the accompanying plan (Plate 3). It would indeed be difficult for human ingenuity to contrive and arrange a set of conditions more thoroughly unhealthy, or more likely to predispose the inhabitants to epidemic disease. Sixty-six houses shut in on two sides by a graveyard, on the other two sides by the adjoining buildings, honeycombed with cesspools, the atmosphere of the dwellings and courts polluted by the continued admixture of putrid exhalations from a number of open conduits, so as to impregnate the whole air both internally and externally with a strong cesspool odour, notwithstanding the use of chloride of lime for the purpose of abating the nuisance; add to these things a deficient and poisonous water-supply, and an overcrowded population, and there will be no difficulty in accounting for the catastrophe which followed. I subjoin on the following page the statistics of the attack which took place on the 10th of June, 1849, sent to me by Mr. Williams, medical officer of the district, to whom I am also indebted for the plan of the locality.

A more deplorable event perhaps never occurred than these tables describe. A very slight consideration of the whole circumstances is in my opinion sufficient to prove that this great sacrifice of human life was occasioned by ignorance or negligence, as flagrant as any which from time to time gives rise to railway or other accidents. A glance at the plan will show that something like sanitary improvements had actually been contemplated; and no doubt it was believed that the object would be attained if only a sufficient number of drains and privies were constructed. Like every other step taken in a false direction, the

so-called improvements increased the evil they were intended to mitigate, and, with the other circumstances above detailed, caused the untimely death of many innocent persons.*

WELLINGTON COURT.

Houses.—Left side.			Houses.—Right side.		
No.	Cases.	Deaths.	No.	Cases.	Deaths.
1	..	..	1	3	1
2	3	3	2	1	1
3	..	..	3	1	1
4	2	1	4	..	..
5	..	..	5	1	1
6	4	..	6	1	1
7	1	..	7	1	..
8	..	..	8	1	1
9	1	..	9	1	..
10	..	..	10	..	..
			11	2	1
Total .	11	4	Total .	12	7

The three deaths in No. 2, on the left-hand side of the court, took place in a family who had just removed from Gloucester-court. An inspection of the plan will show at once why the left-hand side should have suffered less than the right. It will be seen that the latter has a row of open privies behind the houses, and that a death took place in every house under the floor of which a drain passed :—

WELLINGTON-BUILDINGS

Houses.—Left side.			Houses.—Right side.		
No.	Cases.	Deaths.	No.	Cases.	Deaths.
1	1	..	1	2	1
2	..	..	2	2	2
3	..	..	3	..	..
4	1	1	4	1	1
5	3	1	5	2	..
6	..	..	6	..	..
7	1	..	7	1	1
8	3	..	8	3	2
9	..	..	9	4	1
10	2	..	10	5	..
11	2	1			
12	..	..	
Total .	13	3	Total .	20	8

* Notwithstanding the terrible warning given in this case, and the temporary measures adopted at the time, I learn from Mr. Clark's report on Bristol, which I have seen while this sheet is passing through the press, that within twelve months after the catastrophe everything has reverted to its old condition, and were cholera to recur it would find its former haunts ready to receive it!

GLOUCESTER-COURT.

Houses.—Left side.			Houses.—Right side.		
No.	Cases.	Deaths.	No.	Cases.	Deaths.
1	uninha	bited.*	1	2	2†
2	ditto		2	1	..
3	ditto		3	5	1
4	ditto		4	..	..
5	ditto		5	1	1
6	5	3	6	1	..
7	2	..	7	..	..
8	..	..	8	4	4
9	2	1	9	..	..
10	..	..	
11	1	..			
12	1	..			
13	3	2			
14	5	..			
Total .	19	6	Total .	14	8

The following is a summary of the attacks :—

Courts.	Inhabited Houses.		Cases of Colera.	Deaths.
	Attacked.	Free.		
Wellington-court .	14	7	23	11
Wellington-buildings	15	7	33	11
Gloucester-court .	13	5	33	14
Totals . . .	42	19	89	36

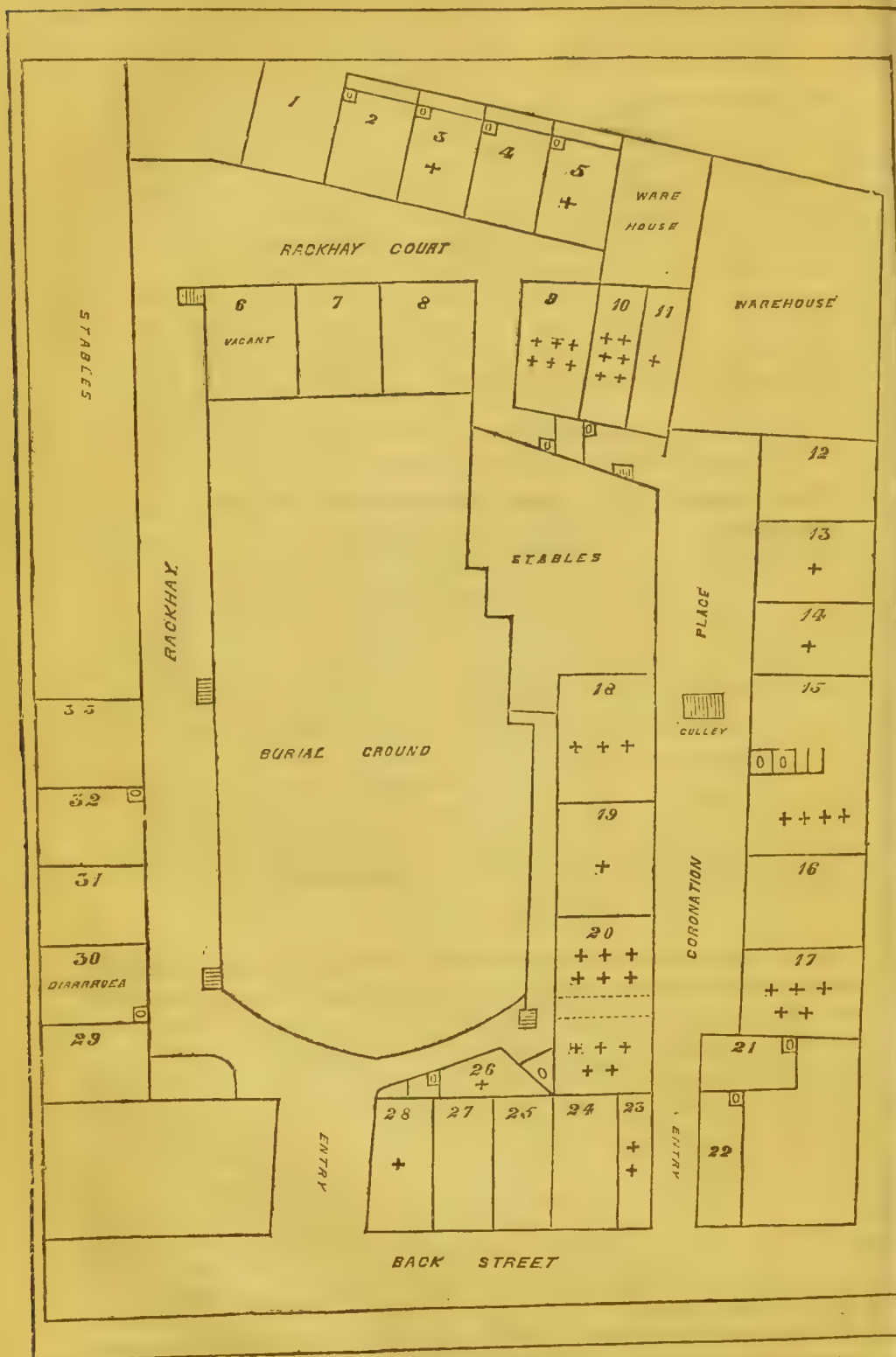
The total number of deaths from first to last was 44.

8.—*Graveyards, &c.*

Bristol affords more than one example of an outburst of cholera, in which a chief exciting cause was the existence of an overcrowded burial-ground in the affected locality. The most striking of these illustrations is afforded by a place called the Rackhay, situated in St. Nicholas parish, and behind the front row of houses in Back-street. The Rackhay consists of an irregular square of buildings, entered from the street by an arched passage, and having a burial-ground occupying the whole centre of the square, with only a narrow passage, varying in breadth from 6 feet to 11½ feet, between it and the houses. Running parallel with one side of this square, and separated from the burying-ground by a row of cottages, is a long narrow court called Coronation-

* The inhabitants of the first five houses fled on the appearance of the disease, and none of them suffered.

† These deaths took place immediately after the family had left Gloucester-court, on account of the attack of cholera. The only two privy-drains which pass under the houses are those in No. 1 and No. 8 on the right-hand side, where the greatest mortality took place.



Plan of the Rackhay and Coronation Court, Bristol. The crosses show the number of Cholera cases. The position of the gully-grates and privies is also shown.

place, which has a similar ventilation to that of the Rackhay. The burial-ground is about 80 feet in length, and between 40 and 50 in breadth, and the surface of the earth in it is about $4\frac{1}{2}$ feet above the level of the pavement in the courts. It is completely surrounded by houses, and there are drains with open gully-grates close under the external walls, the odour from which was most offensive, and had an unmistakable graveyard smell. The surrounding houses are 33 in number, and there are in addition two stables in Coronation-place, the walls of others forming part of the boundary of the Rackhay. A number of offensive privies are contained in the houses, and in Coronation-place is a large offensive gully-grate, while another opens into a small yard at the top called Gun-yard. The relative position of the affected locality will be easily understood from the annexed plan (Plate 4), which also exhibits the number of houses attacked, with the casualties in each. The following table exhibits the general statistics of the attack from the commencement to July 15th:—

Outbreak of Cholera in the Rackhay.

Houses.	Inmates.	Cholera Cases.	Deaths.	Houses.	Inmates.	Cholera Cases.	Deaths.
1	3	..	..	18	6	3	..
2	11	..	..	19	4	1	1
3	7	1	1	20	24	11	7
4	10	..	..	21	5	..	..
5	13	1	..	22	6	..	..
6	empty	..	..	23	2	2	1
7	8	..	..	24	3	..	..
8	8	..	..	25	4	..	..
9	8	6	4	26	4	1	..
10	8	6	4	27	8	..	..
11	2	1	1	28	9	1	1
12	4	..	..	29	2	..	..
13	11	1	1	30	10	diarrhœa	..
14	8	1	..	31	unaffected	..	..
15	16	4	2	32			
16	4	..	..	33			
17	14	5	3				

Up to the end of the attack the number of cases was as follows:—

Cholera	.	.	.	.	.	.	47
The deaths	.	.	.	.	.	.	33
The recoveries	.	.	.	.	.	.	14

It will be seen by a reference to the plan, that the disease confined itself chiefly to the houses on the right-hand side of the burial-ground, where the attack ran its course with great severity. Had it continued for a longer period, it is probable that not a house would have escaped, as diarrhœa had begun to appear in the houses on the left-hand side. There were no local sanitary defects which tended to make the Rackhay more liable to an epidemic outburst than other districts in the same neighbourhood, except the presence of the burial-ground, and the polluted state of the drainage, to which I have no doubt it materially contributed. At that period, however, the neighbouring localities

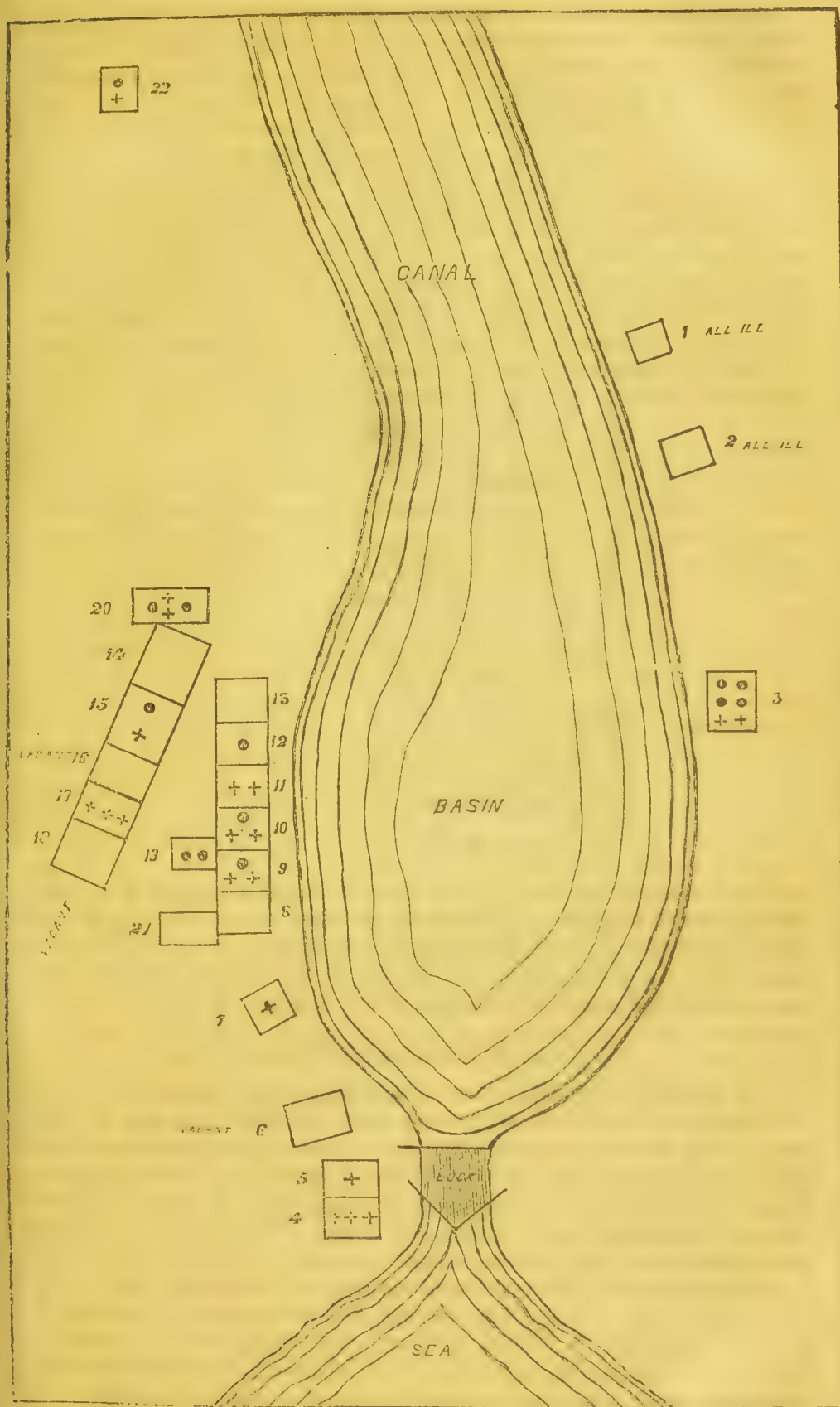
burying-ground, behind the opposite side of Back-street, where several severe cases of cholera occurred. It is impossible to decide whether the burial-ground was the sole cause of the visitation, but all the circumstances tend to prove that it was at least one of the most powerful agents in determining the localization of the epidemic.

9.—*Exhalations from Putrescent Mud.*

While epidemic cholera was prevailing in the town of Cardiff in the month of June, 1849, a sudden attack of the disease took place at a locality about a mile and a half distant from the town, under circumstances which could leave no possible doubt as to the *exciting cause* in that special instance. There is a considerable tract of unoccupied land between Cardiff and the sea through which the canal passes, and at the point where it enters the sea there is a lock and basin, on either side of which are a number of houses. There are also houses at some distance from the line of the canal, but they are exposed to conditions in every respect similar to the rest, with the single exception of their being placed beyond the reach of any exhalations which might arise from the canal. If the outbreak about to be described had arisen from merely general causes, the probability is that all the neighbourhood would have suffered equally; but every house escaped except those close to the side of the basin, and the reason of such a selection will be sufficiently obvious.

The position of the affected houses with regard to the exciting cause of the disease will be best understood by reference to the annexed plan (Plate 5).

On the 26th of May the end of the canal nearest the sea was emptied, in order to admit of repairs of the lock. By this process a large surface of black putrescent mud was exposed to the direct action of a hot sun, and the result was, that very offensive effluvia were immediately perceptible. The smell was complained of by the inhabitants of all the adjoining houses, and produced a variety of symptoms, varying in intensity in different individuals. The most common was general indisposition and oppression of the nervous power, marked by languor and lowness of spirits, and also with some degree of giddiness. To these in a number of instances succeeded general prostration, coldness, tremors, vomiting, diarrhœa, cramps in the bowels, developed cholera, and death. An intelligent woman described the manner in which she was seized, as follows:—She was affected with nausea, vomiting, cramps in the bowels, and purging, but she rallied from the disease, and finally recovered. In the same house, however, six persons were seized with cholera, and four died. A number of workmen were engaged in the repairs of the lock, some of whom lived at a distance in the country, and others lodged in the neighbouring houses. There were also loungers hanging about the works. Several of the workmen who slept in the country were seized with cholera on their return from their work, although there was no disease in the place where they lived. Amongst the men who lodged near the canal several were attacked, and the idlers also suffered more or less. One day, while I was at the lock, the timekeeper was suddenly struck down. The attack resembled a very violent cold stage of intermittent fever. It was, however, true cholera, from which by prompt treatment he recovered.



32 *Fatal effects of Intemperate Habits during Epidemics.*

The following table exhibits the number of casualties. The numbers of the houses refer to the corresponding numbers on the plan :—

	Houses.	Inmates.	Cases of Sickness.	Deaths.
	1	4	All more or less ill .	..
	2	6	All ill, one severely .	..
	3	6	6 cholera	4
	4	9	3 cholera . . . .	..
	5	5	1 cholera . . . .	..
	6	Vacant.	..	..
	7	5	1 cholera . . . .	..
	8	6	No sickness . . . .	..
	9	10	3 cholera	1
	10	14	3 cholera	1
	11	6	2 cholera . . . .	..
	12	4	1 cholera	1
	13	6	No sickness . . . .	..
	14	2	No sickness . . . .	..
	15	8	2 cholera	1
	16	Vacant.	..	..
	17	14	3 cholera . . . .	..
	18	Vacant.	..	..
	19	2	2 cholera	2
	20	7	4 cholera	2
	21	1	No sickness . . . .	..
	22	2	2 cholera	1

TOTALS.

Inhabited houses	19
Houses affected	15
Houses free	4
Total cholera cases . . 33 }	43
Other cases of sickness . 10 }	
Deaths	13
Total population	117

The works of the canal were finished as expeditiously as possible, and the water admitted. Persons on the spot stated that the air felt purer immediately, and the disease was arrested, partly from the removal of some of the people, and partly no doubt from the covering of the mud at the bottom of the basin with a stratum of water.

10.—*Drunkenness—Fatigue.*

The influence of habits or acts of intemperance in occasioning attacks of cholera has long been fully recognised. It will, therefore, be unnecessary for me to do more than give a few general conclusions and illustrations from the experience of the late epidemic. A striking instance of the fatal results of drunkenness occurred on board a vessel in the roadstead of Sunderland early in October, 1848. This vessel had arrived from Hamburg, and one death had occurred on board shortly after leaving that port. She was consequently put in quarantine, and I went alongside of her in a small steamboat, for the purpose of making the needful inquiries. I saw all the crew, who appeared to be in perfect health, and one middle-aged man was especially communicative, and afforded a good deal of information in regard to the vessel. I gave the people instructions how to act in case the disease should again appear, and

especially cautioned them to avoid intoxication, which I assured them would lead to certain death. This was about seven o'clock p.m., and, immediately after I left, the man referred to went down to the fore-castle, where he had secreted a bottle of brandy at Hamburg, and drank a large quantity. In an hour or two afterwards he was collapsed, and died the next morning at seven o'clock.

I have elsewhere instanced the case of the village of Carnbroe, in Lanarkshire, as affording a striking proof of the results of intemperate habits in predisposing to cholera.

Similar drinking habits led to a great increase of the cholera cases in Glasgow, in spite of the preventive measures, which had previously made a distinct impression; and it was observed that periodic augmentations of the disease were coincident with the earlier days in each week, which could only be attributed to the intoxication which followed the weekly receipt of wages. While discussing the removable causes of cholera, I cannot but express regret at the small amount of restraint which has hitherto been put on this abominable vice. The whole licensing system, and the way in which it is too frequently administered, are a public disgrace, and call urgently for reform. In every fresh outburst of cholera, persons of dissipated, intemperate habits have been the first to fall victims to the disease, and I feel assured that many lives were sacrificed which might have been saved, had the vice of drunkenness met with that discouragement on the part of authorities and the legislature which its detestable and brutalizing tendency, as well as its injurious effects on the public health, have so long demanded.

Effect of Fatigue.—During the prevalence of an epidemic constitution, fatigue is a powerful predisposing cause to attacks of cholera. I have seen a great number of instances of this amongst different classes of people. Persons engaged in iron-forges, and other equally laborious occupations, have suffered in large proportion. The length of time during which the exertion is continued appears to be a more important element than the actual present amount of work, and hence it has been necessary in a number of instances to place the men on what are called short shifts.

From want of attention to this matter, casualties have occasionally taken place amongst nurses in hospitals, and this class of cases is sometimes ranked amongst the results of contagion by inexperienced observers. Medical men have also suffered from a similar cause. I am not aware that any individual died while acting under my own special instructions, and I attribute this favourable result to my having endeavoured to impress upon them the necessity of avoiding over-exertion, and of making immediate application for additional medical aid as soon as they found it necessary. I am sorry to say that I have known instances where a different course was pursued from inadvertence. I met with one case in which the medical officer of a district gave each of his two assistants 24 hours' work and 24 hours' rest alternately. His object was a good one, but the result was fatal to the young men, and in little more than a week both were dead.

The preceding illustrations may be taken as examples of the class of causes which have led to severe outbreaks of cholera all over the country; and, in order to save repetition, I subjoin the following abstract of those defective sanitary conditions which I found in the various cities

and towns which were under my personal inspection during the late epidemic:—

Brief Abstract of Localizing Causes of Cholera.

EDINBURGH.—*Parts attacked.*—Usual fever localities; former seats of cholera; filthy closes and streets; no drainage; stairs, passages, and houses filthy, overcrowded, and unventilated; no domestic conveniences of any kind; water-supply bad; houses often dilapidated; pigsties, middensteads, and other worse nuisances; excreta and other household refuse retained in houses; closes and streets narrow, confined, and ill ventilated.

Parts which escaped.—The new town. Streets open, wide, well paved and sewerd; houses clean, large and airy; good water-supply and drainage. Diarrhoea prevailed extensively, proving the presence of the epidemic, but only a very few cases of cholera.

I had three maps of Edinburgh prepared; one showing the usual fever tract; another the tract of the cholera; and on the third were marked the localities in which the sanitary conditions were found on inspection to be the most favourable for propagating epidemic disease. On comparing the three maps it was found that the markings in all coincided.

LEITH.—Cholera confined to old fever localities, and the seats of the epidemic of 1832. First case occurred in a house close to the one first attacked in 1832. Affected localities filthy, undrained; water-supply defective; badly paved, overcrowded, and unventilated.

PORTOBELLO.—Affected localities damp, unsewered, and without drainage. First cases occurred close to a stream of water, and in a dark cellar habitation under the level of the street.

NEWHAVEN.—Attack chiefly confined to cottages built on the slope of banks. No sewerage or drainage, and the percolation of the moisture from the bank rendered the foundations damp. Affected streets unpaved, or badly paved; middensteads close to the houses; refuse of fish allowed to accumulate; water-supply defective.

GLASGOW.—Cholera began at Springbank; affected houses close to canal, or considerably below its level; whole subsoil charged with water; no drainage; old quarries filled with putrescent fluid; pigsties, middensteads; whole district in a very bad sanitary state, and the usual centre from which epidemics begin and spread over Glasgow. The affected parts of Glasgow the usual epidemic localities. Long narrow closes with lofty houses, middensteads, cow-byres, stables, &c., all of which are sometimes under the houses; whole localities filthy, without domestic conveniences; no household water-supply; population greatly overcrowded; houses unventilated, often dilapidated; passages and staircases very filthy; no drainage; sewerage very imperfect and injurious. Diarrhoea prevailed over the whole city, showing the presence of the epidemic; but cholera confined to the worst localities, except in comparatively few cases, where the premonitory diarrhoea was neglected. As a general rule, the epidemic was most severe in those neighbouring villages in which sanitary precautions were most neglected.

DUMFRIES AND MAXWELLTOWN.—Have been very liable to epidemics

from time immemorial; situation of town in a hollow, surrounded by water of the Nith, and a large extent of wet moss-land; sewerage imperfect; no drainage; whole subsoil damp, and green mosses growing on the walls of the houses even of the best class. Whole town attacked with diarrhoea, but cholera chiefly confined to low damp localities, and there the better class of houses attacked. Parts inhabited by the poorer classes, where the disease was most prevalent, consist of long narrow closes, ill-paved and filthy, with numerous pigsties and middensteads. People accumulate manure for sale close to their dwellings. Water-supply derived from the Nith below the opening of the sewers, and carted in barrels through the town, and sold in small quantities at a high price. Town very filthy and neglected when cholera broke out. Houses dark, confined, unventilated, and in some instances overcrowded.

Maxwelltown is situated on the opposite side of the Nith, and is partly built on the slope of a steep hill, the houses abutting close upon the water. The whole of the affected district was exceedingly filthy, and contained large accumulations of manure and many pigsties. It is undrained, and the water from the hills percolates laterally under the foundations of the houses, so as to render them damp. The water-supply is derived from the river, at points where a good deal of filthy surface-drainage empties itself. From these co-existing causes, the population suffered very severely in proportion to their numbers.

COATBRIDGE, NEAR GLASGOW.—Damp; canal runs through the town; the chief localizing causes, want of drainage, deep gutters running in some instances close to the houses, and containing the accumulated filth of the households. Many of the houses attacked incapable of ventilation, from the impossibility of opening windows. Overcrowded lodging-houses.

CARNBROE IRONWORKS.—Situation elevated and open; undrained; houses without ventilation, and some overcrowded. A severe outburst of the disease took place after the people had been drinking for several days.

PAISLEY AND CHARLESTON.—Affected parts like the usual run of manufacturing towns, and displaying the usual absence of sanitary precautions. Amongst the same class of houses, those suffered most of which the water-supply was defective and derived from wells, while those supplied from the town waterworks suffered least. The suburb of Charleston was very severely attacked, and a number of cases of "cholera sicca" were described as having occurred. The locality is open, and somewhat elevated, but exceedingly wet, and has no drainage. The neighbourhood of the houses filthy, and abounding with dangerous nuisances. Water-supply derived from wells, which are very apt to get foul, from the infiltration of impure fluids from the surface. The whole subsoil charged with water, and a filthy stream runs through the place.

POLLOKSHAW.—Usual fever localities attacked. The first case of cholera, during the late epidemic, occurred in the same house and in the same bed in which the first case occurred in the epidemic of 1832. River-banks much affected. Apartments very small, close, and overcrowded. Whole town damp from want of drainage. Many pigsties and other nuisances.

HAMILTON.—Suffered severely; built chiefly on hill-slopes and hol-

lows, without drainage. Many of the houses attacked old and dilapidated; overcrowded. Whole sanitary condition defective, but the chief element appears to have been dampness in the subsoil, percolating from the slopes.

KILBIRNIE.—The whole town in a wretched neglected condition; no drainage or paving; damp and filthy in the extreme; middensteads full to overflowing under houses. A large open cesspool in front of some cottages in which a great mortality occurred. Another line of cottages had an open cesspool extending the whole length of the street, with privies over it. No conditions could well have been worse. The attack very severe.

INVERNESS.—Town generally very clean; and the affected district, to a superficial observer, might appear in a good condition. Cause of the disease, however, very obvious. Affected houses built on the shingly bank of the Ness, and their foundations below high-water mark; the whole subsoil percolated with water from this cause. A hole dug a few feet deep in the shingle and gravel, and at a considerable distance from the river, collects water immediately. Water-supply from the river; brackish and unwholesome. Cottages generally small and old, and no means of ventilation.

DUNDEE.—Sanitary condition of all the affected district extremely bad. Built on the slope of a hill, undrained, subsoil damp. A large tenement of houses suffered severely, situated in a narrow confined locality; its courts badly ventilated, undrained, and containing offensive nuisances; staircases and passages dark and narrow; houses small, badly constructed, and unventilated; population overcrowded. This tenement suffered from causes similar to those which exist in overcrowded work-houses. Affected parts in general filthy, and many nuisances. Atmosphere of the town rendered further impure by the use of foul water for the factory steam-engines, which is turned out to cool in large open reservoirs in the heart of densely-peopled neighbourhoods. The factory privies are emptied into certain of these reservoirs. A railway runs between the town and the river Tay, so as to cut off the natural drainage; and between the railway embankment and the shore there are enormous accumulations of sewerage and other offensive drainage, covering many acres. I consider the exhalations from these deposits to have exercised a very marked influence upon the health of the population living on the hill-slopes above and at a distance from the reservoirs.

SUNDERLAND.—A very severe outbreak of cholera took place at a large neighbouring colliery, in a number of cottages which had been built only a short time previously on a piece of land which had been a complete swamp and without any drainage. It was stated to me that the places were inhabited before the walls were dry, and that the disease appeared shortly afterwards. Sunderland parish was chiefly affected, the disease attacking the old epidemic localities. The town is built on the slope of a hill, without adequate drainage. The streets and closes are narrow, badly paved, and excessively filthy. The sewers, where they do exist, badly constructed, with enormous, untrapped, offensive gully-grates, close to several of which violent attacks of the disease occurred. These districts abound with offensive nuisances. There are no domestic conveniences, and the public thoroughfares are often made places of de-

posit for disgusting refuse ; the pavement often full of holes, containing filth of all kinds. The houses unventilated, old, dirty, and many of them overcrowded. There is also a considerable cellar population. The higher, more open, and better paved, cleansed, and ventilated streets of Bishopwearmouth escaped almost entirely. There was a good deal of diarrhoea, marking the presence of the epidemic, but very little cholera. The similar districts of Monkwearmouth also escaped.

LIVERPOOL.—This large town has been long notorious for its extremely defective sanitary condition and its liability to epidemic disease. Since the epidemic of 1832 a great deal has been done in the improvement of its drainage, paving, and cleansing, and a vast number of its subterranean cellars have been evacuated. The remaining causes of unhealthiness are defective water-supply and drainage, and the existence of thousands of open cesspools and middensteads. These will, it is to be hoped, be rectified in time under the operation of the Sanitary Act, but there is one special element of disease which appears to have predominated in the present case. It is well known that Liverpool is the most densely built town in the kingdom, and that it has its population more closely packed and overcrowded than any other. Until this great evil can be remedied Liverpool will still be liable to epidemics, mainly confined to those localities where these defective conditions prevail. Occasionally the higher and suburban districts suffer from epidemic disease, which is attributable to the wet clay soil of the neighbourhood, and the almost total neglect of agricultural drainage.

MANCHESTER.—All the affected parts of Manchester were marked by distinct causes of disease, which will be found specified in the Report on the Relief Measures, while the better parts of the town escaped ; this was specially observable in Chorlton, where cholera was distinctly localized by causes such as those mentioned. Chorlton affords a very striking example of every conceivable sanitary defect accompanying an epidemic seizure of extraordinary severity. This occurred in a small street of three houses, situated close to the Medlock, which at that point is neither more nor less than a wide, open sewer. Over this street an arch of a railway bridge passes, so as to exclude light and air. The only access is by a narrow, dark, filthy passage, and its only ventilation is tainted by the foul exhalations from the river. *No fewer than 12 cases of cholera occurred in this locality.* Although the wide, open, regular streets of Chorlton escaped the disease, there was one exceptional case, in which a number of houses built over the course of an old brook, now a common sewer, and having their drainage connected with it, were attacked. The exception in this case is a valuable piece of evidence. The Board of Guardians of Chorlton Union caused an inquiry to be made into the sanitary condition of Chorlton, Ardwick, and Hulme, the result of which was the production of three valuable reports proving the causes which led to the localization of cholera. *This enlightened proceeding, if followed by other Boards, would very soon lead to the discovery of the sources of much of the disease and pauperism which press so heavily on the country.*

The cholera in Salford occurred chiefly in narrow, confined, ill-ventilated, and badly drained streets, but some of the notorious fever localities escaped on account of alarm having been taken at their condition, and the

requisite sanitary improvements effected in anticipation of the appearance of the epidemic. One open street suffered severely from the use of unwholesome water. Every house in which this water was used was attacked either with diarrhœa or cholera, while the houses of the district in which it was not used escaped.

HULL.—From its peculiar local position and other circumstances the whole of the borough of Hull is in a defective sanitary condition, and, had the epidemic influence been more powerful than it really was, the calamity which befel the town must have been wide spread and destructive. The drainage of Sculcoates and North and South Myton takes place into open, stagnant, offensive ditches, and at present is altogether insufficient for the wants of the town. The subsoil is damp, and the atmosphere moist and heavy. The parts more peculiarly liable to epidemic disease are close, narrow, and ill-ventilated neighbourhoods, badly paved and cleansed, and abounding with pigsties and other nuisances. Many of the slaughter-houses are most offensive and disgusting, and do a great deal of mischief. Some portions of the borough in Sculcoates union were in a worse condition, in regard to cleanliness, than any localities I have visited. Before the cholera appeared they were covered with enormous manure-heaps of the most dangerous and offensive kind. I have elsewhere shown the fatal effects of these accumulations on the health of the neighbourhood. In fact, the cholera located itself in the worst parts of the borough; and in all the instances which came under my own personal observation, it made its selection where the population had evidently been suffering from the effect of long antecedent predisposing causes of disease. Here, as elsewhere, the better parts of the town and neighbourhood escaped.

WOLVERHAMPTON UNION.—Cholera first appeared at Bilston in this union. The town is remarkable for the absence of every precaution of a sanitary nature. It is closely built; a large part of it overcrowded; its cleansing and paving are bad; it has no drainage, and no proper water-supply. A brook runs through the town, which is little better than a common sewer, and the water has been used for domestic purposes by the adjoining population. It also supplies water to a steam-engine, which, after having been used for the purposes of condensation, is permitted to cool in a large pond in the immediate vicinity of the houses. This nuisance had been frequently complained of. Cholera broke out in the adjoining houses, and immediately afterwards attacked Wolverhampton and Willenhall. The parts of the former place which chiefly suffered were narrow, confined, undrained, unventilated, and overcrowded localities, while the more open and better parts of the town escaped. Willenhall is traversed by open, filthy, stagnant ditches, and the soil on which it is built is damp and undrained. These circumstances led to a very severe attack both of diarrhœa and cholera.

LEEDS.—Usual fever localities affected; imperfectly drained, paved, and cleansed; many open, offensive gully-holes; neighbourhoods close, ill-ventilated, and overcrowded; narrow courts and streets, with middensteads open, and privies close to, and in many instances under the houses; cellars numerous, and many overcrowded lodging-houses. Water-supply, where obtained from wells, frequently unwholesome; and exhibited, under the microscope, a considerable amount of animal and

vegetable matter, apparently proceeding from the percolation of impure fluids from the surface.

SHEFFIELD.—Nearly the whole town and neighbouring villages suddenly attacked by diarrhœa; cholera confined to a few localities close to the river-banks. One of the most prominent evils in the affected places, whether in Sheffield or the neighbourhood, was the state of the water, either being drawn from the river, or from wells which received impurities. This water, under the microscope, afforded indications of a large amount of animal and vegetable matter. The precautionary measures taken by the board of guardians were of so efficient a nature that the usual causes of disease were removed, while this one remained in a few circumscribed localities.

BRISTOL.—Cholera attacked old fever localities; some of the worst, which had been put in a good sanitary condition, escaped. The predominating causes were defective cleansing, especially in the out-parishes; an inefficient and in some instances a positively dangerous state of the drainage, affording several striking illustrations of the evils of ill-considered sanitary alterations; overcrowded graveyards; narrow, close, confined localities; and the use of impure well-water, which in some instances was found to be extremely offensive, apparently from the influx of sewerage. The disease showed a strong tendency to locate itself in the neighbourhood of the harbours, and along the river-banks. The higher, more open, and better built portions of the borough, although exhibiting marks of the presence of the epidemic influence, nevertheless escaped the disease.

GLOUCESTER.—The attacks of cholera were in this city confined chiefly to low, close, overcrowded neighbourhoods. Scattered cases occurred in other unhealthy parts of the city, showing the prevalence of the epidemic constitution; but the disease, faithful to its law of localization, showed itself in the greatest proportion where the conditions were most congenial. Proximity to the river, the neighbourhood of nuisances, overcrowding, want of drainage, and an impure water-supply, were the obvious localizing causes.

CARDIFF.—This town is situated on flat, low, undrained ground, abounding with water, and a canal running through it. Though the whole locality is subject to these predisposing causes, it appeared that other conditions were required to excite the activity of the epidemic influence. The open, airy, clean localities escaped with some diarrhœa, while cholera attacked individual houses situated in close, confined, ill-paved neighbourhoods. Proximity to offensive nuisances or to the canal banks, and overcrowding of houses, in many instances entailed on the inhabitants severe outbursts of the disease. A remarkable instance of the effect of a distinct and specific local cause was shown during the repairs of one of the canal locks. A detailed account of this fatal catastrophe has been already given.

MERTHYR TYDFIL AND DOWLAIS.—Before the cholera appeared, Merthyr was perhaps one of the dirtiest towns in the country, and contained thousands of cartloads of manure and house refuse scattered over it. The inhabitants had no means of domestic cleanliness, and no water-supply; and the river which runs through the town is a common sewer,

from the quantity of filth and other matters which it receives in its course. The disease was most severe in those parts of Merthyr and Dowlais which are built on hill-sides—the law as to the natural unhealthiness of such localities, if unprotected by drainage, holding good in these as in other places. Few localities have suffered more than Dowlais, and it would be difficult to find one in which the sanitary conditions were altogether so bad. The paving was defective, no drainage, no water-supply, no household conveniences, no cleansing, and the atmosphere always in a comparatively impure state from the proximity of iron-furnaces. In addition to these predisposing causes, the houses were totally unventilated. Indeed, I do not remember to have seen a single window that would open at top.

TAIBACH.—This village is situated on a flat close to the sea-shore. There are extensive salt-marshes in the neighbourhood. The locality is damp and undrained, and the houses in some instances overcrowded. The ventilation has been obstructed by a railway embankment running through the town. I consider the natural defects in the position of this place and the habits of the population as having predisposed them to the disease.

ROMSEY.—Is built on flat land, permeated by water. It is traversed in all directions by watercourses, some of which run beneath the surface. It is undrained. The first attack of cholera took place in a very small detached house in a densely-peopled neighbourhood. On two of the sides of this house, and close to the foundations, there were two large cesspools filled with offensive matter. The houses in the immediate neighbourhood also suffered. They were remarkably small, without ventilation, and the population overcrowded.

PLYMOUTH.—An outbreak of cholera took place on board an American emigrant ship (the “American Eagle”) which put into this port, after having lost a number of the passengers and crew. The chief circumstances of a local nature which appear to have determined the epidemic seizure were overcrowding and defective ventilation. The sufferers were all either steerage passengers or sailors, who slept in a very close crowded fore-castle. In neither case were the means of ventilation at all adequate. The cabin passengers, whose quarters were clean, open, airy, and thoroughly ventilated, and where every inmate had sufficient cubic space, escaped entirely. There was not even a case of diarrhœa among the cabin passengers, while those in the steerage suffered very much both from diarrhœa and cholera.

LONDON.—Previous to the introduction of the preventive measures into the metropolis, I was directed by the General Board of Health to inspect the districts most affected by the epidemic. The experience derived was most instructive, as it proved to a demonstration, that wherever the favouring conditions existed, the epidemic selected its victims from all classes of the population. In most other cities the worst districts are inhabited by the lower classes, but in some parts of the metropolis the great thoroughfares are inhabited by people in easy circumstances, while the immediate vicinity is crowded with the lowest class of houses. There are certain circumstances, however, common to all the inhabitants, and these are inefficient drainage, cesspools under or close to the houses, a subsoil saturated with organic matter, and not

unfrequently large accumulations of refuse in the cellars or basement of the dwellings themselves; the proximity of trades dangerous to health, which are permitted to be carried on without control; overcrowded graveyards; and defective water-supply. These causes affect the health of the entire community in certain parts of the metropolis, and I have little doubt that all classes of the population within the limits of the epidemic seizure suffered in a nearly equal proportion. The same classes in the higher, better drained, more open and healthy parts of the metropolis, either escaped the cholera entirely or were only affected by the milder diarrhœal stage; but even over the extensive surface covered by the epidemic, there were some spots in which the sanitary conditions were more than usually bad. The population crowded together, offensive ditches and sewers running close to the houses, the proximity of nuisances, and other similar circumstances, determined the selection of such spots for the special ravages of the disease. Certain local peculiarities also had a most marked and fatal effect upon the population. The south bank of the Thames, from its low level and utterly inefficient drainage, which, indeed, does more harm than good, suffered greatly, and afforded an instance of the injurious tendency of ill-advised sanitary works. The localities most affected are built on the ancient mud deposits of the river, and on made ground, which appears to be composed of unwholesome refuse of various kinds, the whole subsoil being more or less charged with organic matter. The water-supply in many instances was discoloured and very foul. London, indeed, affords illustrations of almost every imaginable sanitary defect and negligence. Those local causes of disease which are met with, either singly or combined in small proportion, in cities and towns in other parts of the country, are collected together within the circuit of the metropolis, and I know of no locality in which the influence of conditions injurious to health can be studied under a greater variety of aspects, or their effect on the propagation of epidemic diseases more distinctly traced.

SECTION II.

MANAGEMENT OF CHOLERA THROUGH ITS LOCALIZING CAUSES.

On this subject there is evidence to show—

1st. That it is possible to prevent the localization of the epidemic, by removing the obvious topical causes which precede and accompany its attacks.

2nd. That, if from their magnitude or nature it be impossible to abate these causes, the same object may be attained by the removal and dispersion of the people.

I shall consider these in succession.

1. *Localizing causes removable.*—Had the warning voice of the former epidemic been heeded, and had proper steps been taken to remove those local conditions which all experience had shown to be

the concomitants of outbursts of cholera, it is possible that the epidemic influence might have been attended with results scarcely more fatal than those of the milder diarrhoeal stages. No sooner, however, had the disease disappeared than the mere temporary efforts at amelioration, which had been made during its presence, were suspended. No sanitary works of a permanent nature were undertaken; an increasing population was allowed to accumulate in all our towns, while no additional measures were adopted for protecting them against those dangers which always accompany overcrowding. All the former evils resulting from bad drainage and water-supply, defective paving, want of ventilation, and want of cleansing, were left untouched; and when cholera again appeared, it went to its old haunts, located itself in the same filthy streets, courts, and alleys; it harboured in the same houses, and sometimes carried off its victims from the same bed. In every district which it attacked its ravages were most fatal where the sanitary conditions were the worst. It took a smaller number from amongst those who lived in healthier localities; and, as a general rule, it may be stated that those parts of our cities and towns which careful observation would pronounce as likely to be the most healthy, escaped almost entirely.

The epidemic was no respecter of classes, but was a great respecter of localities—rich and poor suffered alike or escaped alike, according as they lived in the observance or violation of the laws of their physical well-being.

If then it be a law of the epidemic to attack only such parts of towns as are in a bad sanitary condition, and to leave the healthy portions untouched or nearly so, it is perfectly obvious that if it be within the power of art to raise the sanitary condition of the districts which suffer, to that of those which escape, it must be possible to ensure to the entire population of towns the same immunity from epidemic attacks which is now enjoyed by only part of the population.

Results such as these can only be obtained through permanent sanitary improvements, though beyond all doubt they can be approximated to by the rigid enforcement of cleansings, removal of nuisances, and other similar means: but in order to make temporary sanitary ameliorations effective to the preservation of human life, they ought to be in operation for some time before the epidemic prevails in the district. In the great majority of cases, however, the most extraordinary apathy existed in regard to this matter; and it was generally thought to be sufficient to begin the cleansing of bad districts of towns when the disease was in the immediate neighbourhood. I have no doubt that beneficial results arose even from these very imperfect measures; but that they were by no means what might have been attained, is sufficiently proved by the experience of towns where a more enlightened and intelligent management was pursued.

The remarkable effects produced by the lime-washing of houses and entire neighbourhoods is certainly an exception to the general conclusions stated above. In the use of this measure of prevention there could be no doubt whatever that the disease was immediately checked in many instances. Houses with filthy, damp, mouldy walls, are peculiarly liable to become the nurseries of fever and cholera; and during

the prevalence of the former class of diseases the utility of quicklime-washing had been fully recognised. The General Board of Health, therefore, wisely ordered it to be employed as a measure of prevention against cholera, the favouring conditions of both types of disease having been found to be identical. Numerous cases occurred in which considerable districts were subjected to the process, both within the houses and on the external walls, and I know of very few instances in which the disease appeared in houses which had been protected in this way.

The ordinary fever districts have escaped cholera after being lime-washed, and yet, as is well known, they are the usual habitats of the latter epidemic. Many illustrations of this fact could be adduced; but one, taken from the Report of Dr. James Maxwell Adams, on the Thirteenth Medical District of the city parish, Glasgow, will suffice:—

“At No. 15, College-street, there is a back tenement of five flats, having a building of equal height in front, and at a distance of about nine feet. A considerable part of the ground-flat of this back tenement forms a common dungstead; and it is built up at the back by another tenement of equal height, which contains nearly the same number of houses and of inhabitants, who are of the same class in both. The building in 15, College-street, is as unfavourably situated in regard to light and ventilation as can well be imagined; the two tenements have hitherto been nurseries of disease. During the last six months of 1847, almost every house had two or more cases of typhus. I anticipated, therefore, a considerable amount of disease; and from the onset of the recent cholera epidemic I directed special attention to the buildings, and caused a house-to-house visitation to be made once or twice daily. From first to last there occurred in 15, College-street, only two cases of choleraic disease; while in the other tenement there occurred fifteen cases, of which three proved fatal. It may be difficult to account for this unusual contrast, unless from the circumstance that the relative condition of the two tenements became altered. A few months prior to the commencement of the epidemic, No. 15, College-street, passed into the hands of a factor, who caused all the houses and lobbies of the tenement to be whitewashed thoroughly several times, and by constant inspection enforced habits of cleanliness on the tenants. In the other tenement which suffered, matters remained in their usual dirty condition.”

Similar facts will be found in subsequent parts of this Report.

I would refer to the Report on Sheffield, given elsewhere, as affording a very good illustration of the beneficial results produced by the intelligent and persevering use of preventive measures for a period long anterior to the invasion of the epidemic. Such cases, I am sorry to say, have not been numerous; but it is satisfactory to know that there is not an instance of the failure of similar measures in protecting the population, wherever they were applicable and zealously carried out.

A consideration of the more prominent causes of epidemic outbreaks will show that the most powerful of them do not admit of removal by mere temporary means. Dampness and defective drainage can only be remedied by extensive permanent works, and a power to compel ventilation in houses and to prevent overcrowding is still a desideratum.

Again, the consequences of an impure water-supply must be obviated by seeking new sources and better methods of distribution. The evils resulting from the crowding of a large number of dwellings on a small superficial area—a practice which intensifies every other cause of disease—can only be met by stringent laws and by the spread of intelli-

gence and the spirit of enterprise among that class of builders who provide houses for the labouring classes.

The great lesson taught by the late epidemic is, that in future we must proceed to deal vigorously with these standing causes of disease and pauperism, if we are really in earnest to rescue our population from the ravages of fever and cholera.

2. *The Removal of the People.*—The only escape from the fatal effects of permanent causes of disease, which cannot at once be removed, is to be found in the second of the methods indicated above, to wit, the removal and dispersion of the people. This practice was found to be very successful at Edinburgh during the epidemic of 1832, and it was made matter of special regulation by the General Board of Health in all the parishes affected during the late outbreak of the disease. Large roomy buildings in healthy localities were sometimes made use of; at other times it was found necessary to erect suitable wooden sheds, and in several instances tents were used. The advantage of this method of procedure depends on the fact that cholera rarely remains long in the same district. It attacks individual houses, groups of houses and streets; so that between 30 and 40 per cent. of the cases over a whole town occur in houses where more than one person has already suffered. In *groups of houses* attacked the percentage rises very much higher, and the danger to the people, by leaving them in their dwellings, is enormously increased. By referring to the examples of these outbursts already given, it will be found that no fewer than 87 per cent. of the cases and 61 per cent. of the deaths took place in houses where more than one person had suffered from cholera. Even in these instances, however, the danger does not in general continue long. If the people be removed and kept away for a week or ten days, and if their houses be limewashed during their absence, they may return home with comparative safety; while the whole number of attacks and deaths of persons removed to the Houses of Refuge is very much below what it would have been had they remained at home. The following table will show the results of this preventive measure:—

STATISTICS OF HOUSES OF REFUGE.

Houses of Refuge.	No. of Inmates admitted from affected Houses.	Total Cases of Cholera in the Refuge.	Deaths.
Edinburgh, City parish .	270	..	..
City parish, Glasgow .	401	19	5*
Barny parish, Glasgow .	406	6	3
Sheffield	145	4	2
Bristol	210	..	..
Dundee	259	4	..
Total	1691	33	10

* The large proportion of attacks and deaths in the refuges in Glasgow may be accounted for by the fact of their having been placed in localities affected by cholera.

The very small proportion of attacks and deaths which this table shows is quite sufficient to prove the efficacy of the Houses of Refuge as a means of saving life. All the persons admitted into them were taken from houses where the disease had actually appeared, or from their immediate vicinity. That many were powerfully under the influence of the poison of cholera is proved by the fact, that a large proportion were seized with severe choleraic diarrhœa, either before or within a day or two of the time of admission; but as all the inmates were inspected by the medical officer twice, or oftener, during the day, very few even of these severe cases passed into cholera. The mortality from the epidemic has varied from 1 per cent. to 3, 4, and even 7 per cent. on the entire population of towns. These proportions include not only those in localities more immediately affected, but the unaffected population also. *The parties removed to houses of refuge were all taken, as has been stated, from infected houses or localities, and yet the table exhibits a proportion of deaths to the inmates of less than 0·6 per cent.* It was observed that the general health of the people was materially improved during their stay in the Refuge, in some degree, no doubt, from the better diet provided for them, but mainly, I conceive, from their having been withdrawn from infected localities.

It is very much to be regretted that this system was so inefficiently carried out in many of the affected parishes. I found almost everywhere a want of intelligence in appreciating its importance; and I hardly know an instance, except in a few of the Scotch towns, in which a House of Refuge was prepared before the disease made its appearance. Even after hundreds of persons had died, I have occasionally experienced great difficulty in inducing Boards of Guardians to provide the needful accommodation. This has arisen partly from the obstacles which popular prejudice has thrown in the way of obtaining suitable premises—one of the necessary fruits of the doctrine of contagion—and partly from the fear that pauperism might be increased. The marked beneficial results which have been observed wherever a House of Refuge has been properly worked, warrant me in stating that a great many lives have been sacrificed all over the country from want of attention to the orders and notifications of the General Board of Health in regard to this matter.

SECTION III.

MANAGEMENT OF CHOLERA THROUGH ITS PREMONITORY STAGE.

1. *The Premonitory Stage of Cholera.*—It has been an observed fact ever since cholera became known to the medical profession, that by far the greater proportion of cases are preceded by a distinct premonitory stage, varying in intensity from slight disturbance in the functions of the intestinal canal onwards to the production of symptoms of a decidedly choleraic character; and in duration, from several days to a

few hours, before the full development of the disease. Cases, no doubt, take place in which the premonitory stage is either absent, or so short in its duration as hardly to attract notice; but such cases, on rigid inquiry, were found to be very few in number; while many, supposed to have been sudden, proved, on investigation, to have been preceded by a well-marked premonition.

During the epidemic of 1831-32 these circumstances did not escape the observation of the medical profession in this country; and there were few points in regard to cholera on which a larger amount of concurrent testimony could be cited than the almost universal prevalence of a premonitory stage, and the absolute necessity of directing the medical treatment specially against it. It would be easy to quote examples showing that the progress of the disease had been traced by "watching the appearance of the dejections: at first, dark coloured and feculent, becoming gradually paler; and lastly, colourless, like rice-water." In one instance no fewer than 500 cases of cholera were minutely investigated, and were, almost without exception, found to have been preceded by diarrhœa of from ten to twelve days' duration; and in some instances even beyond this period. Medical men concurred in stating, that in the early stage cholera admits of being cured with certainty; and that were attention paid to the premonitory diarrhœa, the disease might "be driven out of the country." Dr. Barry, who was no mean authority in such a case, said emphatically, in regard to the diarrhœal stage, "Stop it, and you save your patient."

It became customary at the time to issue notices, warning the people of the danger of delay, and to open dispensaries for the gratuitous distribution of medicines; and no doubt many lives were saved by this procedure. The establishment of a kind of medical police, to watch over the health and sanitary condition of the people in affected districts, was first recommended by the Central Board of Health in 1831. The late Dr. Kirk, of Greenock, in his "Practical Observations on Cholera Asphyxia," published in 1832, strongly advised that this inspection should be made compulsory, for the purpose of discovering premonitory cases. In the same year a partial trial was made of it in a district of Newcastle-on-Tyne, and another by Dr. Brown, of Sunderland, in an outbreak of cholera at Hetton in August, 1832. But the real importance of house-to-house visitation as a preventive measure was not at that time understood or recognised; and subsequent experience has proved that the methods proposed for carrying it out would have been impracticable.

The local Boards of Health were more engaged in dealing with cholera as a disease than as a pestilence, and every conceivable plan of treatment was tried under circumstances nearly as hopeless as those which accompany gangrene after enteritic inflammation. The result was, and still is, that in its fully-developed form cholera is a disease which admits of little aid from medicine; and that the real element in its management is TIME—to which all methods of treatment should be considered as merely subsidiary. In the early stages there is no disease more easily manageable, and in which so great an amount of human life and suffering can be saved; but in its later stages there is hardly a disease more completely beyond human control, and of which so large

a proportion of cases must inevitably perish. Cholera is, of all others, a disease which ought to be managed by preventive medicine; but it is, of all other diseases, that one in which the smallest amount of reliance should be placed on medicine simply curative.

The experience furnished by the cholera of 1831-32 has been amply confirmed by that derived from the late epidemic. The existence of a premonitory stage, and the comparative ease with which the patient may be treated in that stage, have been fully demonstrated, so that both may now be considered established facts of medical knowledge: but, in addition to these, strong additional evidence has been afforded of the unity of cholera throughout all its stages. So thoroughly has this latter fact been impressed on the minds of many eminent practitioners, that I have occasionally experienced considerable difficulty in obtaining statistical data, in consequence of its being found "impossible to draw any line between the most severe cases of cholera and the ordinary diarrhœa prevailing, warranted by any pathological distinction." This conclusion, which was stated by eminent members of the medical profession, rests on that kind of evidence which is derived from careful observation; but during the late epidemic I obtained striking statistical evidence of the same fact.

It was observed in Glasgow that the female sex was more liable than the male to attacks of cholera.

Without entering into the reason of this greater apparent susceptibility, we may assume it as a law of the disease applicable to that locality. If the diarrhœal forms be part of the epidemic, and have a tendency to pass into true cholera, we should expect to find not only that the female sex was more liable than the male to such forms, but that the liability would increase as their severity increased. This was accordingly found to be the case, as the following table will show:—

PERCENTAGE of Attacks, in different stages, of Choleraic disease in Males and Females, in Glasgow.

Classes of Cases.	Number of Cases.			Percentage of Attacks in each Sex.	
	Males.	Females.	Total.	Males.	Females.
I. Diarrhœa and Bilious Purging .	331	432	763	43·4	56·6
II. Cases approaching to Cholera, with Rice-water Purging, &c. . . }	130	195	325	40·	60·
III. Cholera	851	1320	2171	39·2	60·8

The number of cases appears to me sufficient to warrant the conclusion as to the unity of the entire epidemic, especially as the two first

classes of cases were treated in the same districts in which cholera prevailed. Had they occurred in localities where developed cholera did not exist, they might have been considered as cases of diarrhœa, accompanying the disease, but not identical with it; but under the actual circumstances, the evidence appears conclusive. Another equally important proof is arrived at through the comparative mortality of different stages of the disease.

The great number of choleraic cases brought under treatment in all parts of the country, and the pressing calls on the time of the medical officers, have rendered it a matter of impossibility to obtain a precise account of the features of the entire epidemic, but tables compiled from the returns of Dr. Miller, and the reports of Dr. A. M. Adams, and Dr. J. M. Adams, three of the medical superintendents in Glasgow, give some interesting and valuable particulars in regard to a large number of these cases. They form, as it were, a chart of the disease throughout its entire stages, and exhibit at the same time, in a very satisfactory manner, the results of early treatment. The total number of premonitory cases treated amounted to 1445, and the total number of cases of developed cholera to 392. They afford examples of nearly every progressive stage of the disease, from simple diarrhœa without complication to developed cholera, the cases passing in their progress through important changes by the addition of symptoms increasing in danger, while the mortality is also found to increase in a corresponding ratio. Thus, in 1113 cases of simple diarrhœa the deaths were 6, or 0·538 per cent. In 49 cases of bilious purging without vomiting or cramps, there were no deaths, the number no doubt being too small to give such a result. In bilious purging, with vomiting and cramps, the cases were 43, and the deaths 3, or about 7 per cent.; of rice-water purging there were 280 cases, and 12 deaths, or about 4 per cent. The addition of other symptoms in this peculiar stage of the disease appears to be attended with a great increase of danger. Out of 108 cases, in which the serous character of the stools was accompanied by vomiting, there were no fewer than 42 deaths, or nearly 39 per cent., and the addition of cramps to the other symptoms, which occurred in 281 cases, raised the mortality to 149, or 53 per cent. Perhaps no clearer proof could be given of the unity of the disease and its progressive danger.

Even where the disease had gone on to Cholera, or where the premonitory symptoms had become so violent as to excite alarm, and thus induce the patient or his friends to send for medical aid, a ratio was found to exist between the *earliness* of such application and the result of the treatment. This must be a self-evident fact; but it may be stated that from data furnished by Dr. James M. Adams, it appears that, of those Cholera cases which were brought under treatment within six hours of the time of attack, the percentage of deaths was only about 21. Between six and twelve hours, the percentage rose to above 33. Between twelve and twenty-four hours, 45 per cent. died; and when a delay of more than twenty-four hours took place before application was made for medical aid, the deaths rose to above 62 per cent. These facts may explain to a certain extent the great mortality of Cholera; and while they afford a very strong argument for making some attempt to lay hold of the disease in its earliest stage, they prove that, for the purpose of *prevention*,

the parochial medical relief, as applied under ordinary circumstances, affords only a very partial and inefficient protection to the poor during an epidemic visitation.

I am aware that objections have been made against the doctrine that all the diarrhœa cases occurring during an epidemic of Cholera are necessarily a part of the disease, and fraught with danger if neglected. But if we find diarrhœa suddenly sweep over an entire city in the depth of winter, when the disease is usually very rare, and if it be accompanied by violent and fatal outbursts of Cholera, the question may fairly be asked, If this diarrhœa be not part of the epidemic, what is it, and by what broad marks can it be instantly distinguished? I have no hesitation in expressing my own opinion, that the diarrhœa is as much a part of an epidemic of Cholera as the margin of a destructive inundation is part of the flood. It is quite true that every case may not be attended with equal peril to life; but there is abundant evidence to prove that the ratio of danger is determined by the locality where the cases occur, or by the greater intensity of the epidemic influence over one portion of the affected area than over another, rather than by any apparent difference in the cases. Whatever variety of opinion there may be on these points, it is practically impossible to make any distinction, at least in districts affected by Cholera. Were it even the fact, which I am by no means disposed to admit, that there are pathological differences in the cases, these cannot be recognised for one instant as warranting our treating one class and neglecting to treat another. Pathological distinctions, to be of any practical importance in such cases, would require to be not only so very obvious that any medical man could detect them at a glance, and infallibly predict what attacks are dangerous and what might be safely left without treatment, but they must be sufficiently striking to guide the sufferers themselves to the formation of a sound judgment. There must be no mistake on this point, as it is a matter of immediate life and death; and yet, from the very nature of the case, anything like certainty must be impossible. If it be asserted that the diarrhœa which precedes Cholera cannot be arrested, such a proposition may be safely left without further notice till it is proved. It certainly receives no countenance whatever from statistical facts. That individual cases have occurred in which diarrhœa has passed into the rice-water purging state, and thence into fatal collapse, notwithstanding the most active treatment, is perfectly true; but it is at the same time true that the number of such instances has been very small indeed, while nearly the whole of the fatal epidemic cases have never been seen by a medical attendant until they were either in absolute collapse, or rapidly verging towards it.

If then, in those districts where Cholera has become localized, the various classes of cases must be practically considered as progressive stages of one fatal pestilence; and if experience has demonstrated that there is a constant ratio between the period at which the disease is brought under treatment, and the success of the means adopted, the conclusion must be self-evident, *that the whole force of the Medical preventive measures should be directed against the earlier stages of the disease.* The treatment of the epidemic as a unity has amply confirmed the truth and paramount importance of this deduction, as the following table will demonstrate:—

Stages in which Medical treatment was first applied.	Per centage of Deaths.	Per centage of Recoveries.
Diarrhœal	0·25	99·75
Choleraic	5·00	95·00
Cholera not collapsed . . .	29·22	70·78
Collapse not pulseless . . .	70·18	29·82
Collapse pulseless	86·10	13·90
Secondary collapse	97·00	3·00

The data for the above table extend to many thousand cases of the disease, occurring in Cholera localities, and the milder forms are not to be confounded with those which take place in the neighbourhood of, but not in, districts affected by Cholera.

2. *The arresting of Cholera by treatment in the premonitory stage.*—In order to lay hold of the disease in its early stage, two kinds of measures were recommended in the Notifications and Regulations of the General Board of Health. First, the opening of Dispensaries, and the issuing of suitable notices urging on the people the necessity of immediate attention to all disorders of the bowels; and secondly, the inspection of the population in affected districts, and the immediate treatment of all persons found suffering from premonitory symptoms.

The first of these has most frequently been carried out by itself; indeed, I know only of two cases in which Boards of Guardians have of their own accord adopted both measures. It has generally been presumed, that if the usual parochial medical relief were extended to meet the emergency, by the addition of a few Dispensaries, and if the people were fairly told where to apply for aid, the Board had discharged the whole duty incumbent upon it in this special matter. I have often experienced great difficulties in bringing Guardians to see the necessity of adopting any other medical preventive measure. The general feeling has been that to send a medical man to seek for cases of disease was going quite beyond the reasonable sphere of their arrangements, and in some cases the visitors were not appointed until the epidemic had done its work, and they were too late to be of any service. We can hardly imagine that the almost invincible obstinacy which has in some cases been displayed, in a matter of actual life and death, could have arisen from inhumanity. It is rather to be attributed to the fact, that the parties upon whom the Contagious Diseases Prevention Act had placed onerous and responsible duties in a time of pestilence, were not the most suitable to protect the people.

The results of the Dispensary system of relief, when pursued alone, have been the successful treatment of a large number of the simpler forms of diarrhœa, but a still larger class of cases escaped its operation altogether, and it was hence found that while those who had been treated at the Dispensaries were saved from the more serious attacks of the disease, the Cholera cases occurred in the great majority of instances amongst persons who had made no application in the diarrhœal stage, and were

first seen by the medical attendant in a state of collapse. It may be said that the parties who suffered were themselves to blame, in not having made application for the means at their disposal, but a very ample experience has convinced me that those who are in most danger are least likely to apply, because there is a state of the nervous system connected with a severe epidemic seizure, the tendency of which is to make the sufferer apathetic. The sentient nerves are dulled, and important constitutional changes take place without pain. The discharges which are sapping the very powers of life are permitted to go on, not only without check, but with a certain consent to the feelings of relief which are experienced. No alarm is taken till it is too late, and in not a few instances the relatives have been first aroused to a sense of danger by the last death-struggle of the patient; it has likewise happened that the medical visitor, in going his rounds to seek out cases of diarrhœa, has found the dead bodies of those for whom no medical aid had been sought or procured. Fifty-one such examples occurred in one parish in Glasgow alone. I know an instance of this fatal neglect which happened in the person of an eminent physician, who was particularly successful in the Cholera of 1831-32, because he directed his treatment against its early stages, and who, during the late epidemic, was fully alive to the absolute necessity of seeking out and treating the poor in their own houses; nevertheless, with his judgment perfectly convinced as to the danger of delay, and in spite of the urgent representations of professional friends, he permitted a slight attack of diarrhœa to progress unchecked, and did not think it even needful to go to bed, until sudden and fatal collapse put a period to his existence. A very striking case of the same kind is mentioned by Dr. Malcolm in his Report on the Cholera in Dundee. A system of medical inspection had been introduced into the factories in that town at the instance of the General Board of Health, and it became part of the duty of the mill overseers to warn the operatives to apply for advice immediately on being taken ill. Dr. Malcolm says that one of these overseers "suffered from diarrhœa for five or six days without asking any medical aid till it ended in cholera, though he was daily during the time he was ill with diarrhœa reporting to the medical attendant of the mill the cases of this disease that occurred among the mill-workers under his charge." This case also proved fatal. I mention these illustrations, because they afford conclusive proof to my own mind of the danger and inutility of trusting to the feelings of a patient as indicating the necessity for medical relief; indeed, it has not unfrequently happened that, while the poor who were under medical visitation were escaping with diarrhœa, their richer neighbours, left to themselves, were suffering from Cholera. Sad experience has proved that a time of pestilence is very generally a time of mental apathy; and even during the late epidemic people otherwise intelligent have been content to suffer because "all were dying." Under such circumstances the visitor, if he discharge his duty efficiently, becomes a messenger of mercy, to rouse the apathetic, to caution the vicious, to enlighten the ignorant, and to heal the sick. The *à priori* necessity for some more efficient method of staying the ravages of Cholera than the opening of Dispensaries, is thus founded on the very nature of the disease.

3. *House-to-house Visitation.*—There are two ways in which a

system of house-to-house visitation may be carried out,—the first by lay visitors, the second by medical men. The former plan was urged upon the Parochial Boards by the first Notification of the General Board of Health, but the advice appears never to have been followed, and the reason assigned was that it was either impossible to obtain the voluntary unpaid services of suitable persons, or, if an attempt at visiting were made, it was not followed up with regularity sufficient to make it effectual. A better result was obtained from the adoption of a paid lay agency, by which the cases were sought out and reported immediately to the medical officer of the district, who proceeded at once to visit and take charge of the patient. This was the plan adopted at Bridgeton, Glasgow, and under certain circumstances will be found useful, but wherever the epidemic exists in force, a staff of medical visitors is the only one that can be relied on. The sole objection to be urged against it is the difficulty of obtaining an adequate number of gentlemen to undertake a work so apparently extensive and dangerous, but this difficulty has never been a practical one, because, on a close examination of the manner in which towns are attacked by Cholera, it will be found, as stated elsewhere, that the disease in its virulent aspect is almost invariably confined to circumscribed localities. Even while Cholera prevailed in a greater or less degree over the vast area of the metropolis, I found that, with the exception of a few scattered cases, the great bulk of the mortality occurred within a very narrow compass in each district attacked. This was indeed the law observed by the epidemic; and, besides, it seldom lasted long at any one point, but attacked a number of points in succession.

The practical deduction from these peculiarities obviously is, that a very large staff of visitors is not required, as a small number can cover the affected localities, and it is in these, with few exceptions, that the really dangerous form of diarrhœa occurs. The great secret consists in so organizing and directing a small staff of visitors, that they may hunt out the disease wherever it is to be found, and this service requires to be performed with all the precision of a military movement.

The plan of organizing a town must necessarily depend upon its magnitude, and its local sanitary peculiarities. Where the population is small, it will in general be found sufficient to divide the town into such a number of districts as will enable the visitors appointed to make a thorough inspection of every affected locality, once or oftener in the course of the day, and possibly one medical superintendent would be sufficient to direct the operations of the visiting staff. In cities and towns where the inhabitants are numerous, and where several parishes are affected, the present state of the law points out a separate organization for each; and it has been customary to conduct the whole of the preventive measures of every parish or union independently, under one or more medical superintendents appointed by the guardians. In all cases in which a subdivision of the parish into districts for the ordinary purposes of medical relief was found to exist, it was deemed advisable to preserve such subdivisions for preventive purposes, as being already well known to the people. In some cases the usual medical officers of these districts, with a suitable number of qualified assistants, undertook not only the treatment of all cases of Cholera, but also the superintendence of the staff of visitors within the district. In others, however, it was found

needful to separate entirely the medical visitation of houses from the ordinary treatment of Cholera, and to appoint special superintendents to direct the preventive measures.

Practically, it was found to be needful to organize such a machinery as appeared best adapted to cope with the local peculiarities of the epidemic, but I considered it always to be advisable to keep the visitors at their special work of prevention.

The method usually adopted for carrying out these views was as follows:—Immediately on arriving in an affected town I placed myself in communication with the local authorities, and proceeded to examine minutely into the nature of the epidemic cases and the sanitary defects of those houses and districts where they occurred. I next reported to the local authorities on all the steps of a preventive nature which required to be taken in conformity with the Regulations of the General Board of Health, and pointed out the special directions in which the regulations ought to be carried out to meet the existing emergencies. In a number of instances it was found to be needful to apply to the Board for special powers to do certain things which could not be done under the general regulations, as it was found to be very difficult to induce the local authorities to interpret the powers granted to them in a sense sufficiently broad to be of much use in saving human life. The special regulations generally pointed out all the details of the machinery required, even to the number of beds for the House of Refuge, and the number of visitors and additional medical aid to be procured. In order to save time, it was customary to proceed at once to organize the machinery, under a promise that the special regulations would be sent as soon as they could be prepared. In many cases medical aid had to be obtained from considerable distances.

The visiting staff was directed as follows:—

First,—the seat of the disease was determined.

Second,—a suitable number of visitors was despatched into the affected districts, with instructions to visit from house to house, once a day, or oftener, according to the violence of the attack, and to treat on the spot all persons found to be suffering from Cholera, or its premonitory symptoms. As it was necessary, however, that the time and energies of the visitors should be devoted as much as possible to arresting the disease by treating it in its earliest stage, they were required to hand over immediately to the ordinary medical attendant all cases of Cholera they might meet with.

Third,—Each visitor was supplied with a box containing appropriate remedies, such as calomel, opium, ether, essence of peppermint, &c.

Fourth,—He was directed to report without delay, all houses, streets, &c., which needed cleansing, and all nuisances requiring removal.

Fifth,—All the visitors met at a stated hour each day, and gave in to the superintendent a schedule containing the particulars necessary to enable him to form a judgment as to the course the disease was pursuing, in order that he might direct their operations.

Lastly,—The visitors and medical officers were required to use their influence in inducing the removal of families from infected houses to the houses of refuge, and patients to hospitals, and they also warned the people as to the absolute necessity of temperance and cleanliness, and of the danger of neglecting the slightest indications of the disease.

I usually drew up a Code of Instructions for the guidance of the superintendents and visitors, and also the schedules required for collecting information as to the progress of the epidemic.* Notices were printed and circulated among the people, giving them every information as to the means adopted for their protection, and requesting their co-operation.

Dumfries was the first town in which the preventive methods were fully tried. It was at first contemplated to attempt the visitation by a lay agency, but the state of public feeling in the town appeared to render the organization of such an agency a hopeless matter. I had previously made a house-to-house visitation in several of the affected parts of Edinburgh, and ascertained that visitation by a medical officer would be well received by the people; and considering the local character of the epidemic at Dumfries, and the universal prevalence of a marked premonitory stage, I deemed it to be my duty to recommend the adoption of this modification of the system, by "enjoining all medical officers to visit not only Cholera cases, but to make a house-to-house visitation throughout their respective districts, to carry with them medicines for immediate use, and to administer them on the spot to all persons affected by diarrhœa. The visitation to be made once a day at the least." This recommendation was dated the 7th of December, and it was accordingly made matter of order by the General Board of Health in its Special Regulations of the 9th December, 1848, and was carried out with a degree of success so remarkable, that it was subsequently applied to all cities and towns affected by Cholera.

I have elsewhere given special reports on a number of towns as illustrations of various kinds of organization adopted, and shall merely state generally the nature of the results which followed.

Some of the first returns made by the visitors stated that a number of dead bodies had been discovered within the preceding twenty-four hours, and that they had found a great many cases of Cholera in various stages of development, proceeding to a fatal termination, not only without medical aid, but without any apprehension of danger on the part of the sufferers or their friends. These were of course placed under immediate and active medical treatment, and the result was a rapid diminution in the proportional fatality of the disease. Were this the only result, it would of itself be sufficient to justify the entire machinery of medical inspection, but, in addition to the cases of developed Cholera brought under treatment, there were discovered a vast number of cases of diarrhœa and rice-water purging, in none of which had the patients applied to any dispensary. The cases last mentioned were found to be exceedingly amenable to treatment, as may be seen by the tables already given, and as many were doubtless arrested in their progress towards developed Cholera, we should naturally expect a marked diminution in the number of Cholera cases reported. We have here then two facts of paramount importance: first, a diminution of mortality; second, a diminution of attacks, and consequently a very striking change should be exhibited in the statistics of the disease. Such would inevitably be the case were it possible to place the entire population under strict superintendence, and were the attack of the

* Specimens of these are given in the Appendix, and in the Report on Glasgow.

epidemic always a *single one*. The Regulations of the General Board of Health, however, were specially directed against the disease as it occurred amongst the *necessitous* classes. Persons in the receipt of wages and not requiring casual aid could not legally be made chargeable to the parochial authorities, any more than the richer portion of the population, although it was generally understood that the line of demarcation was not to be rigidly drawn, always keeping in view that the object was to save life.

Again, the disease usually attacks large cities as if they consisted of groups of villages, first one portion and then another being seized, and the disease following pretty much the same course in each instance; many of the first cases being sudden and fatal, and being succeeded by cases with marked premonitory symptoms. If the preventive measures even stopped all the cases in the early stage in one locality, still the cases resulting from the fresh seizure of another locality would be recorded in the daily schedules, so that a smaller apparent statistical effect would be produced than really was the case. The only fair experiment, therefore, would be to take a district where there was only *one* epidemic seizure, and where, as a general rule, the disease had a well-marked premonitory stage. If the population were a small one, and if an efficient preventive medical staff were placed over it, the full effect of the house-to-house visitation, with open dispensaries and extensively distributed notices, would then become immediately apparent. Several very striking illustrations of this have taken place in Scotland. The epidemic seizure of Dumfries was a *single one*, and the cases, almost without exception, had been preceded by neglected diarrhœa. The striking results of the preventive measures in this instance will be found detailed in the Report on Dumfries.

The town of Paisley furnished a similar illustration. The suburb of Charleston was placed under active medical visitation when Cholera amounted to twenty-three cases a day. Here also the first cases discovered were true Cholera, and all the premonitory cases had opalescent stools. The cure of the latter was attended by an immediate effect on the statistics of the disease, and on the fourth day of the *complete* visitation the Cholera had fallen from twenty-three cases a day to *three*, and the disease shortly afterwards disappeared. It is a striking fact, that, in two or three days after the first rice-water purging cases were discovered, they too declined in numbers, and gave place to cases of simple diarrhœa. This arose partly from the growing efficiency of the visitation, and partly from the people becoming better acquainted with its objects, and giving earlier information to the visitors. The whole daily number of premonitory cases discovered little more than counterbalanced the Cholera cases which had disappeared from the schedule, proving that the diarrhœa cases were all, or nearly all, true premonitory cases. In other districts of Paisley, where equally active measures were not adopted, the disease began earlier, and went on for a much longer period, than it did at Charleston. In this case also the medical officers concurred in stating that the subsidence of the disease was clearly connected with the discovery and treatment of the earlier cases.

The accompanying statistics (Table VIII. and Plate 6) exhibit in a striking manner the breaking up of the disease in Charleston by the

visitation system, as contrasted with its course in other districts of the same town not under active medical visitation.

The first epidemic seizure of Inverness was limited to 20 cases of choleraic diarrhœa; I could not ascertain that another case had occurred. The first ten cases all proved fatal from not applying for aid sufficiently early. The last ten cases were brought immediately under treatment, and all recovered.

Most large cities would furnish similar illustrations, but I shall select one from the Barony parish, Glasgow. The Parkhead district of that parish is a circumscribed one, so that the population could be placed under comparatively strict inspection, and so efficiently were the measures carried out, that throughout the entire epidemic the premonitory cases amounted to no less than 2379 per cent. of the Cholera cases. On some days the premonitory cases were to those of developed Cholera in the proportion of 3000, 3300, 5900, and even 6000 per cent., and the result on the Cholera, as will be seen by referring to Table IV. and the diagram (plate 7), was the complete breaking up of the disease, leaving entire days during which all the cases appeared in the premonitory schedule only, to which it was indeed confined with a few exceptions during the whole month of February. The Report on Manchester gives similar facts.

Where the conditions have been favourable for the experiment, the results have been as stated; but it has happened in circumscribed districts where the sanitary conditions have been exceedingly defective, and where the attacks ran their course with great rapidity, that the visitation system has not produced such results as those now detailed, and for the obvious reason, that there was no marked premonitory stage against which it could be brought to bear. In these last instances, the entire dispersion of the people, provided it had been practicable, would have been the only safe course. If the defective sanitary conditions which are connected with rapid attacks cannot be removed from the people, the people must be removed from the cause. There is no other remedy.

In large cities, as has been already stated, the conditions for a full experiment do not exist. All that could be done was to use the visitation system to drag as many as possible out of the fatal grasp of the epidemic. Upon the whole then, though, from the nature of the case, the *exact amount* of good effected by the preventive methods adopted cannot be ascertained with precision in every instance, no mind open to the reception of evidence can doubt that much suffering was prevented and a large amount of human life preserved. There is abundant proof that an effect was produced on the whole statistics corresponding to that which was so strikingly apparent in all those cases where a proper groundwork for this kind of evidence existed. In the reports on the towns will be found the opinions of medical men who actually witnessed the practical results of the preventive measures, and these, along with the statistical evidence, are sufficient to settle the question as to their entire efficiency when zealously carried into operation.

SECTION IV.

SPECIAL REPORTS ON TOWNS.

I.—REPORT on the PREVENTIVE MEASURES adopted for the Relief of CHOLERA in DUMFRIES during the EPIDEMIC of 1848-49.

I HAVE elsewhere given an abstract of the causes which make Dumfries and Maxwelltown liable to attacks of epidemic disease ; some of these are peculiarly of a topical character, but all, so far as I can perceive, admit of removal. There were, however, certain very obvious localizing causes of cholera, which might have been removed before the epidemic began. These had all been pointed out in the published notifications of the General Board of Health, and in the circular of the Board of Supervision, but the efforts made to abate the evils alluded to were so partial that nothing really effectual had been done. While the disease was committing the most frightful ravages there were still numerous offensive middensteads and pigsties : a filthy state of the affected districts, and no houses had been cleansed or limewashed. The medical arrangements were most defective, there was no proper dispensary relief, no house of refuge, and the Parochial Board of Dumfries had broken up the system of medical relief they had previously sanctioned, and left the town to the mercy of the pestilence at a time when between 20 and 30 deaths a day were taking place out of a population of 10,000.

In consequence of several applications having been made to the General Board of Health, by persons in authority in the town, I was directed, by telegraph, to proceed from Glasgow to Dumfries. I did so immediately, and arrived on the afternoon of the 6th December, 1848. In the course of the evening I conferred with the authorities and the remaining medical officers, from whom I received information as to the condition of the town and the nature of the epidemic seizure, and ascertained that, while diarrhœa was almost universally prevalent, every case of cholera had been preceded by a distinct premonitory stage of some duration. I also met the Parochial Board, and requested that a messenger might be despatched to Glasgow and Edinburgh for more medical aid, which was done before the meeting broke up. Having only been a few hours in the town, the information I had received was necessarily incomplete, and next morning I resumed the inquiry. I very soon found that matters were in a much worse position than had been previously represented to me, and that it would be necessary to obtain special regulations to enforce the carrying out of specific measures to meet the existing emergency. The diarrhœa was spreading with frightful rapidity ; the existing medical staff was entirely inadequate for the purposes of prevention which I contemplated, and was, moreover, beginning to suffer, and there appeared an absolute necessity for collecting a large additional number, and turning their whole energies to searching for and treating the disease in its premonitory stage. In the course of the day (the 7th) I drew up and despatched the neces-

sary information to the General Board of Health, and the committee of the Parochial Board agreed in the mean time to send for a sufficient number of medical men to carry out the work.

The following abstract of Reports forwarded to the Board will show the nature of the various steps taken and the results which followed :—

Dumfries, Dec. 9, 1848.

In my letter dated the 7th instant, I pointed out the neglect with which the regulations of the Board had been treated, and showed, that up to the period of my arrival, no proper steps had been taken in the way of cleansing, providing a house of refuge, and organizing a proper system of medical relief. Since that date the following course of procedure has been agreed to by the Committee of the Parochial Board.

1st. The committee has given orders for appointing a proper cleansing staff to undertake the needful operations in all houses where disease has been, or is likely to appear.

2nd. A house of refuge has been opened this evening, and has twelve beds ready to be disposed of.

3rd. Steps have been taken for obtaining an adequate supply of medical attendants on the sick. When cholera appeared there were nine resident medical practitioners in Dumfries, whose services were accepted by the Parochial Board, and afterwards dispensed with on account of some pecuniary consideration, and apparently without a thought as to the probable result to the poor. Two were eventually employed, and two strangers from neighbouring parishes were brought to the town. A great amount of work was thrown on these four individuals, and, as a consequence, one of them is dangerously ill with cholera in Dumfries, and another was seized at Lockerby, a town about 12 miles distant, where he is at present ill. The disease is supposed to be cholera. Fortunately I had induced the Parochial Board to send to Glasgow for assistance on Wednesday night last, and had this not arrived in time to be put in operation to-day, there would have been *only two* medical men to attend all the cases. Such was the state of things up to this morning.

One of the gentlemen now ill is surgeon to the gaol, which has been deprived of his services at this critical period. I saw a case of premonitory diarrhoeal symptoms, another case of inflammation, and another of phthisis, all requiring attention, and dependent on casual medical aid, within the gaol, on visiting it to-day.

The remaining medical men of the town have all suffered more or less from the epidemic, with two exceptions. One is ill with cholera; two are unable to work from premonitory diarrhoea with which they have been attacked; another is suffering, it is feared, to a fatal extent, from the effects of over-exertion on a weakened frame;* so that, instead of the four resident medical men, whom I stated as likely to act, two only remain. Of the two strangers who were brought to town one will apparently die of cholera. This is one of the two cases mentioned above.

* This gentleman, Dr. McLachlan, died on the forenoon of the 10th December, of a rapid attack of cholera.

The disposable staff this morning, as has been said, was two. Other three have arrived from Glasgow, and have been through their districts this evening. Another is on the way hither. After much discussion, the Committee of the Parochial Board agreed to accept the services of the remaining two medical officers. I have thought it advisable that they should act as superintendents of the town. One half has been allotted to each. They will be ready to attend consultations when called on ; to advise generally with the medical staff ; to look after the statistics ; and to see that the directions of the Board are acted on. The disposable staff to-night amounts to seven—five district surgeons and two consulting officers—and another district surgeon will, I hope, arrive in the course of the night. This staff, however, is not sufficient, and eight additional qualified practitioners will be obtained as soon as possible. I am desirous of using this large number as a preventive medical police over the town. Their duties will be—1st. House-to-house visitation, and the administration of remedies on the spot where needful. 2nd. The treatment of cases of cholera. 3rd. The carrying out rigidly all the regulations of the General Board of Health which are binding on parochial surgeons.

Dumfries, Dec. 14, 1848.

SINCE last I had the honour of reporting to the General Board of Health on this subject a great improvement has taken place, and, so far as time and opportunity have permitted, the regulations of the General Board have been carried out. The chief defects I formerly complained of were the want of an efficient medical staff, neglect of cleansing, and the want of a house of refuge. The amendments which have taken place are as follow :—

1st. The town has been divided into nine districts, and a tenth or landward district has been added.

2nd. To the management of these there have been appointed, up to the present time, thirteen district surgeons and two superintendents, making a staff of fifteen in all. I consider the present arrangement, when coupled with the diminution of cases, as being sufficient for the various preventive purposes contemplated, especially as I have enjoined on the medical officers, in the printed document herewith sent, the necessity of applying for more medical aid whenever needed.

The duties which the medical staff is required to fulfil will be sufficiently apparent from the printed documents already referred to. I believe they comprehend all that the General Board of Health require by their various regulations.*

3rd. The Parochial Board is proceeding actively with legal processes for removal of nuisances.

4th. The cleansing of streets is better done, and the use of the fire-engine is called in for cleansing closes, &c.

5th. A sub-inspector and two additional officers have been appointed by the Parochial Board. The duty of the first of these is to superintend all cleansing operations, especially the cleansing, whitewashing, and fumigating of houses. An active house-cleansing staff has been formed, and proper books are being prepared in which to enter all orders for

* These instructions are given in the Appendix.

cleansing issued by the medical officers, and also the date when they were obeyed. The sub-inspector appears to be an intelligent active man, and I gave him special injunctions as to his duties, and pointed out their supreme importance.

6th. A house of refuge has been open since Saturday night last, and has already received a number of inmates.

7th. Four or five druggists' shops are open during the day, and two during the night, to dispense medicines to all necessitous persons.

8th. I have drawn up the accompanying printed document, headed "Important Notice," a copy of which will be left at every house in Dumfries; and it is to be hoped that, along with the influence of the ministers of religion of all denominations, who have willingly come forward to lend their aid, this document will act beneficially in removing popular prejudice, and in smoothing the way for the "medical inspectors."

Lastly. It having been represented to me, that it was customary to draw the only water supply of the town from a portion of the river immediately below the outlets to the common sewers, I have used my influence to put a stop to this most injurious and unnecessary practice, and with success.

Dumfries has now the advantage of a well-organised, and, so far as I can at present judge, an efficient system of medical and preventive police; and I look forward to the result with feelings of no ordinary interest.

Dumfries, Dec. 20th, 1848.

THE Reports which I have had the honour of laying before the General Board of Health in regard to the epidemic cholera, recently prevalent in Dumfries, have related chiefly to the deficiencies in the arrangements made by the local authorities for meeting the disease, and the progress which has, from time to time, been made in the adoption of effectual preventive measures. It now becomes my duty to report on the working of the system laid down by the General Board of Health, by its special regulations of the 9th December, and to inform the Board of the very remarkable results which have ensued. Before doing so, however, it will be necessary to give some details as to the history of the epidemic.

The first case of cholera reported occurred on the 16th November. The disease progressed slowly for a few days, and a system of medical relief, apparently well adapted for meeting it, was first agreed to, and then broken up, by the parochial board. The lamentable consequences which followed on this act have been alluded to in previous Reports, and another result was, that no accurate reporting of cases could be carried out. The only record of the progress of the disease was kept by the inspector of the poor, from such data as he could obtain; the bulk of the resident profession having refused to report cases, in consequence of the manner in which they had been treated by the parochial board. The following table gives the aggregate number of cases entered on the book, up to the period when our machinery was so far advanced as to enable us to obtain accurate daily returns:—

Date.	New Cases.	Date.	New Cases.
November 16	1	December 1	13
„ 19	2	„ 2	33
„ 20	1	„ 3	31
„ 21	4	„ 4	22
„ 22	6	„ 5	17
„ 23	6	„ 6	23
„ 24	2	„ 7	13
„ 25	3	„ 8	14
„ 26	4	„ 9	6
„ 27	12		
„ 28	16		172
„ 29	18		82
„ 30	17		
	82		254

The total deaths reported up to the last date was 86.

These returns, however, are far short of the truth, as I shall presently show; but I am sorry to say that there are no data in existence from which anything but an approximation to it can be obtained.

Wherever I have yet been engaged in Scotland in the exercise of public duty, I have found similar difficulties. The registration is in a most disgraceful condition; or, rather, to speak more correctly, there is no registration of deaths or diseases at all. In some cases the names and dates only are kept in a common pass-book, in which they are entered from hardly readable scraps of paper prepared by the sexton. I have met with cases where absolutely no record is kept. The ground is opened, the body is interred, and the name forgotten. All this is most discreditable to the intelligence of the present age. Even in Dumfries, the chief town of a Scottish county, it is impossible to obtain accurate information as to the ravages of a mortal epidemic, which, within one short month, has carried off above 250 of its inhabitants! The extent of this great public calamity is absolutely unknown; and so far as preventive measures for the public safety depend on obtaining the necessary knowledge, they cannot be put into execution.

It appeared desirable, however, to obtain as close an approximation as possible to the truth, and for this purpose the following steps were taken:—

There are three places of interment in Dumfries: 1st, St. Michael's; 2nd, St. Mary's; 3rd, St. Andrew's (Catholic chapel). The number of cholera cases, recorded as such in the two latter places of interment, are known; but in St. Michael's there is no such record kept. To arrive at an approximate result, the total burials from November 15th, 1847, to November 14th, 1848 (a year), were taken. They were found to amount to 259, which number, divided by 12, gives a monthly average of about 22; and this, moreover, is the number that was buried in the month between the middle of November and the middle of December, 1847. It may therefore be taken as a fair monthly average. Next,

The burials in St. Michael's churchyard for a month from November 16th to December 15th, 1848, were as follows :*

Date.	Burials.	Date.	Burials.
November 16	2	December 1	13
„ 17	1	„ 2	13
„ 18	3	„ 3	16
„ 21	4	„ 4	25
„ 22	1	„ 5	15
„ 23	2	„ 6	10
„ 24	2	„ 7	12
„ 25	4	„ 8	13
„ 26	6	„ 9	12
„ 27	6	„ 10	16
„ 28	7	„ 11	7
„ 29	8	„ 12	14
„ 30	7	„ 13	11
		„ 14	9
		„ 15	4
In November	53	In December	190
			53
Total for One Month . . .			243
Deduct the Monthly Average.			22
Total presumed Funerals of } Cholera Cases }			221

On inquiry at Maxwelltown, the only other locality in the neighbourhood where the disease prevailed, I found that between the dates specified above, eight burials had been sent from that town to St. Michael's.† These, therefore, have to be deducted, so that the actual number amounts to 213 from Dumfries alone.

The cases marked as cholera in the sexton's book at St. Mary's church, which is done by the primitive expedient of drawing a line below the name, are the following :—

Date.	Burials.	Date.	Burials.
November 28	1	December 7	3
„ 29	1	„ 8	3
„ 30	1	„ 9	3
December 2	2	„ 10	3
„ 3	3	„ 11	2
„ 4	3	„ 12	2
„ 5	4	„ 13	5
„ 6	2	„ 14	3
		„ 15	1
	17		25
			17
Total Cases buried at St. Mary's .			42

* This information was copied from a dirty scrap of paper in the possession of the sexton, the only "Register" of the burials during the month at present in existence.

† The dates of removals from Maxwelltown are—Nov. 30th, 2; Dec. 5th, 1; 8th, 1; 10th, 1; 13th, 1.

In the burying-ground of St. Andrew's Catholic chapel, only one case of cholera was interred.

In addition to the burials in the town of Dumfries, a number were carried to country parishes. The precise amount cannot be ascertained, but I have found that up to the 15th December, six cases were interred in the churchyard of Troquer, and seven were sent by hearses to more distant localities.

The whole number who had died of cholera in Dumfries would, therefore, stand as follows, if the data be considered trustworthy:—

Calculated Burials of Cholera.

Cases in St. Michael's churchyard	213
Registered ditto in St. Mary's	42
Ditto ditto St. Andrew's on Nov. 25th . .	1
Carried to Troquer churchyard *	6
Ditto other parishes †	7
Total	<hr/> 269 <hr/>

This, then, is the approximate number of victims carried off by the cholera in Dumfries within the first twenty-nine days of the existence of the epidemic—an appalling mortality for so small a population (about 10,000).

I arrived in Dumfries on the 6th December, and up to that date I believe that no fewer than 147 persons had already been buried, after having been struck down by the epidemic. The Board is aware that I collected a staff as quickly as possible, arranged the districts, and put everything in motion; but this process required further time, equally precious with that which had been irretrievably lost: and it appears from our returns, that it was not until the 13th of December that any material effect was produced, and by that day 250 people had been consigned to the grave.

The details of the plan carried out, in accordance with the instructions of the General Board of Health, have been already given in my second Report, and it is now with much gratification that I proceed to state the results.

The medical staff arrived by degrees, and was instantly located, and instructions as to the house-to-house visitation given. The thing was new, and required a little delicacy and practice to carry it out; but I am truly glad to say that the duties were entered on with great zeal and ability.

No sooner was the preventive force in full activity, than a remarkable change took place in the statistics. This is shown by the following daily returns made at 5 P.M., at the meeting of the Medical Board. The first was on December 10th.

* The dates of burial are—Dec. 2nd, 1; 3rd, 1; 4th, 2; 11th, 1; 15th, 1.

† The dates of removal are—Dec. 7th, 1; 10th, 1; 12th, 2; 13th, 1; 14th, 2.

Date.	New Cases.	Deaths.	Recoveries.
December 10	37	9	..
„ 11	38	6	5
„ 12	23	9	9
„ 13	11	7	2
„ 14	14	3	5
„ 15*	12	6	2
„ 16	8	5	10
„ 17	4	4	5
„ 18	2	5	1
„ 19	4†	5	..
„ 20	..	3	2

These results appeared to me to be so very remarkable, that I requested the medical officers of the several districts to give me a short statement of their experience, of which the following is an abstract:—

First District.—Medical Inspector, Mr. John Rowbotham.—“Found the first day 14 cases of diarrhœa, two of which became cholera, the rest were checked without any bad symptom. In going round my district since, I have found five others, all of which have been treated favourably. With the exception of these the district has continued quite healthy.”

Second District.—Medical Inspector, Mr. William McGill.—After stating, that on the day on which he entered on his duties he had three cholera cases to treat, and that since that time he had had only four new cases, Mr. McGill says, “This freedom from disease I can only attribute to my daily visitation from house to house in the district, as I have met with a very great number of cases of diarrhœa and premonitory symptoms, which, in many instances, I am quite satisfied would have terminated in cholera had they not been arrested in proper time. The gradual decrease of cholera in this as well as other districts throughout the town, is due, I am confident, to the excellent arrangements laid down in regard to the daily visitation of each house, the duties of which have been so strictly enforced from the medical officers.”

Third District.—Medical Inspector, Mr. McQuaide.—“On the first day, found six cases of diarrhœa; for the five succeeding days ten more: thinks some of these would have gone on to cholera, as he observed in most of them the peculiar whitish and watery stools, in six instances accompanied by vomiting; succeeded in checking most of them: is of opinion that the system has been completely successful.”

Medical Inspector, Dr. William Marshall.—“In fact, I believe all these cases (30 in number) would have terminated in cholera had not the strictest attention to prevent this been paid; only one did go on to cholera. All were found during the house-to-house visitation: I consider the plan to have been completely successful.”

Fourth District.—Medical Inspector, Dr. Dickson, Staff Surgeon.

* There is a discrepancy between the figures in this table and those in the preceding Tables of Burials, which I do not profess to be able to reconcile.

† Only three of these occurred in the district, and one in the gaol. Two other cases in the rural part of the parish are omitted.

—“I arrived in Dumfries on the 8th December, and since that date have had ample opportunities of noticing the great advantages of the house-to-house visitation here adopted by Dr. Sutherland. On my arrival, our utmost exertion was required for attendance on cases already labouring under the worst symptoms of cholera; and for several days so many were the calls to attend the sick, and so deficient the strength of the medical staff, that no time was allowed for our finding cases of premonitory symptoms. Since the arrival of aid, however, I have, by frequent calls on the people resident in the district under my charge, succeeded in finding many cases of diarrhœa, accompanied with vomiting, and in one or two cases even with cramps. I have had little or no difficulty with such cases, not having lost one patient; and at present I have at least 20 such cases under my care. On my arrival I attended from 15 to 20 cases of cholera a day—this number gradually diminished, and at present I have only one. This I can attribute alone to the fact of my discovering cases of diarrhœa before they had proceeded too far. During my daily visitations, I have discovered on an average eight such cases a day.”

Fifth District.—Medical Inspector, Mr. Ferguson.—“Found four premonitory cases, but no cholera.”

Sixth District.—Medical Inspector, Dr. Stevens.—“Has attended 39 well-marked cases of cholera; seen only one in which premonitory symptoms did not occur; by means of the house-to-house visitation, instead of being called to see new cases far advanced in the disease, finds all the cases in an early stage.”

Seventh District.—Medical Inspector, Dr. Fairly.—“Has seen eight cases of diarrhœa, on an average, per day, most of which have, by early treatment, been prevented from running into cholera; thinks the tendency existed in all; is of opinion that the success of the house-to-house visitation has been most marked in the suppression of cholera.”

Eighth District.—Medical Inspector, Mr. Mac Turk.—“Has prescribed for 30 cases of diarrhœa, accompanied in two instances with abdominal cramps, and in four with vomiting; has vigilantly pursued the system of house-to-house visitation, with such success, that not a single case of premonitory symptoms has passed into cholera; as far as he has been able to observe, thinks this preventive system has been completely successful.”

Medical Inspector, Mr. William S. Craig.—“Has prescribed, on an average, for between eight and ten cases of diarrhœa a-day, none of which, with one exception, ran into cholera.”

Ninth District.—Medical Inspectors, Mr. Fife and Mr. Henry J. Carleton.—“Have attended several new cases of cholera, and numerous cases of diarrhœa and premonitory symptoms, which we have no doubt would, in many instances, have terminated in cholera, but for the early treatment they were subject to, resulting from the well-organized plan of house-to-house visitation.” *Mr. Fife* states, “that he has been engaged in visiting cholera cases, since its appearance in Dumfries, in most parts of the town, under different arrangements of the parochial board; but little benefit resulted either in the treatment or arresting the disease until the house-to-house visitation was put into full operation.”

The two medical superintendents of the town, *Mr. Blacklock* and *Dr. Grieve*, state that, "in their opinion, the great and decided advantage of such a plan as that which has been carried out in Dumfries, is placed beyond a doubt by the extraordinary results of the experiment."

The chief points in this unanimous testimony in favour of the preventive system are, the great prevalence of cholera in its premonitory form; the necessity for seeking out such cases by a house-to-house visitation; the ease with which the premonitory stage may be overcome; the advantage which it affords for detecting true cholera cases at an early period of their course, by which the patient's chance of recovery is vastly increased; and lastly, the important practical conclusion which appears to follow, namely, that by a well-organized system of this kind it may perhaps be possible to retain cases in their early stage, and to deal with them then.

As an illustration of the extent to which diarrhoea prevails, the following returns for the districts may be given:—

Districts.	CASES OF DIARRHŒA.		New Cases from 5 P.M., 19th, to 5 P.M., 20th Dec.
	Total under Treatment, 19th Dec.	New Cases since 5 P.M. of 18th.	
1st	7	2	1
2nd	8	4	4
3rd	12	3	3
4th	16	4	4
5th . . . . .	..	..	8
6th	11	2	..
7th	12	5	4
8th	12	2	5
9th	6	3	2
Private cases .	13	5	1
Total under treat- ment, Dec. 19, 1848 }	92		
Total new Cases from 5 P.M., 18th, to 5 P.M., 19th . . . }		30	32

That a considerable proportion of these cases would pass into true cholera, if left to themselves, is beyond a doubt; and it appears reasonable to conclude, that, by keeping a grasp over those cases, the practitioner has a grasp over cholera itself.

These remarks of course apply only to the modification of the disease, as it exists in Dumfries at present. It has a well-marked premonitory stage, and this fact has been made the basis of the system of medical relief now in operation.

It would be premature to come to any very decided opinion as to the ultimate success of the system. Cholera is a most capricious disease, and our knowledge of the laws of its propagation is too limited to justify absolute certainty in our deductions; but the remarkable fact cannot be overlooked, that, immediately on the house-to-house visitation being fairly brought to bear upon it, the disease, as shown by the returns, diminished rapidly; and with this fact before me, and

also the very strong reports of the medical staff to support it, I have deemed it my duty to delay no longer in reporting to the General Board of Health on the subject. Since the above was written, another report has been given in, from which it appears that within the last 24 hours no new case of cholera has declared itself. In the town of Dumfries there are not half a dozen cholera cases *under treatment*, and it is only the doubt which a first successful experiment tends to generate, which prevents me from designating this as one of the most successful attempts at the application of preventive measures ever made, and I trust that some method will be adopted for applying a similar remedy to our large cities when suffering under epidemic disease.

P.S.—The return of the 21st December gave six new cases of cholera, the circumstances of which were so remarkable as to deserve special notice, from their affording another kind of proof of the value of the system of house-to-house visitation. Five of them occurred in private practice, and all had had neglected premonitory symptoms, while the sufferers, from their position in life, did not come within the sphere of the medical visitors, whose duties were confined to the poor. The remaining case was that of a man who, in spite of all warnings, got so intoxicated on the preceding day as to require two men to take him home. This last case cannot properly be taken into the general account, and the visitation thus kept the districts free, while persons in the better-conditioned parts of the town suffered.

APPENDIX TO REPORT ON THE MEDICAL RELIEF OF CHOLERA IN THE TOWN OF DUMFRIES.

On the Nature of the Premonitory Cases treated in the Districts, up to Dec. 29, 1848.—As it appeared to be a matter of extreme importance to ascertain the precise nature of the premonitory cases discovered and treated in the several districts of the town, in order to form some estimate of the value of the preventive system, in dealing with cholera as an epidemic, a request was made to the medical inspectors to furnish the required information, of which the following is a digest:—

In District No. 1, Mr. Rowbotham states, that he has had “upwards of 20 cases of diarrhœa, 10 or 15 of which I believe would have terminated in actual cases of cholera, but for their being early found during visitation, and proper treatment employed.”

In District No. 2, Mr. William McGill states, that he has treated above 40 cases of diarrhœa. “In about 12 of these the symptoms have been pretty severe: vomiting, purging, and cramps in about nine; and in the remaining three, vomiting, purging, and partial suppression of urine without cramps.”

In District No. 3, Mr. Owen M'Quaide says, “I have had about six cases of simple diarrhœa, that is, without rice-water stools, some of which, I think, if not treated early, would have gone on to the rice-water stool; all the rest of the cases of diarrhœa, about 30, had their

specific rice-water stools, and in eight of these cases there was vomiting but no cramps."

Dr. William Marshall, of the same District, states as follows:—"In 50 cases which I have attended since the 11th (Dec. 1848), I had 20 which I consider would have gone on to rice-water stools, three with suppression of urine, 47 without suppression, 20 with rice-water stools, and 12 with vomiting and cramps."

In District No. 4, Dr. James Dickson reports, "I have kept no record of cases of diarrhœa, but have treated upwards of 60, and feel assured that 40 of those would have gone on to undoubted cholera, had they not been treated early. I have no deaths among such cases. I have to add, that in all those cases of diarrhœa alluded to, suppression of urine did not exist; but in the majority there was vomiting, in many cramps, and in a few coldness of the extremities."

In District No. 5, Dr. Macknight states, "that he has had about 40 premonitory cases with vomiting and purging," and goes on to say, that "the recoveries were in consequence of immediate medical assistance being afforded." *Mr. Fergusson* has attended, in the same district, 28 cases of premonitory symptoms, and only two cases of cholera.

In District No. 6, Dr. Steven reports, that the cases of diarrhœa, and other abdominal affections, not cholera, were about 40 or 50; and that the number of cases with opalescent stools did not exceed half a dozen. "These," he says, "were so from the time they attracted attention. Not another assumed that character after being put under treatment."

In District No. 7, Dr. Fairly says, he has no notes of the exact number of cases of diarrhœa which he has treated, but that he has only had "two cases in which the true opalescent stools were present; and in both these cases, they (the rice-water stools) were present when I first saw the patients. All the others I succeeded in checking before they passed into that stage of the disease."

There is no special report from *District No. 8*, but *Dr. Burgess*, who appears to have been employed in this district latterly, states, that since the 20th December he has had 27 cases of diarrhœa; 14 of these were visited before the rice-water purging commenced, and in four there were rice-water stools. *Dr. Burgess* says, "in my opinion, the great majority, if not the whole, would have gone on to cholera had I not been called in time."

In District No. 9, Mr. Fife says, that since cholera first appeared at Dumfries, he has attended a great number of cases of diarrhœa in all parts of the town, and that latterly the stools became of a rice-water description, but vomiting was absent in almost every case. *Mr. Carleton*, in the same district, says, "I have kept no register of diarrhœa cases, but to the best of my recollection I have treated upwards of 30. Of these, more than one-half had the characteristic rice-water dejections, and I have no doubt a considerable number of these would have terminated in cholera but for the active treatment which was put in force. I state this with confidence, from the experience I acquired in Leith when cholera raged there. I have to add, that in one or

two there was diminution of urine, although it did not amount to suppression."

Several of the medical officers state that they have seen characteristic cases of cholera without suppression of urine, but that in the great majority that symptom was present.

The experience in Dumfries has been most instructive and important. It goes to prove that there is a unity in the disease, from its first manifestation of slight abdominal symptoms of various kinds, onwards to severe diarrhœa, next to rice-water purging, vomiting, cramps, and other severe symptoms, and thence to developed cholera, with or without the suppression of urine, according to the intensity of the diseased action, although, for statistical purposes, it appears requisite to assume empirical data, as characterising the various periods of the disease. The practical conclusion must be self-evident, namely, that the only means of dealing with cholera as a pestilence, is the immediate organization in every locality threatened by the disease, of a staff of visitors to go from house to house, for the purpose of discovering and treating on the spot the slightest diarrhœal symptoms. It has been proved by melancholy experience, both in Dumfries and Glasgow, that neither rich nor poor will, of their own free choice, apply for medical aid until the time for its efficient exercise is either past, or the chances of recovery reduced to a very small proportion. The premonitory diarrhœa is, in a large number of cases, attended with sensations rather agreeable than otherwise; the sufferer is lulled into a fatal security, and no alarm is consequently taken till it is too late.

Glasgow, January 4, 1849.

In addition to the preceding reports, I beg to subjoin the following table of all the premonitory and cholera cases which occurred in the districts from the beginning to the end of the house-to-house visitation. It exhibits in a very striking manner the relation between the amount of premonitory cases discovered, and the rapid transference of the statistics of cholera into those of diarrhœa, so that evidences of the natural decline of the epidemic are to be sought for, not in the column of cholera, but in that of the premonitory cases. Cholera generally takes place by sudden outbursts, gradually diminishing in intensity as the epidemic dies away. It will be seen that this is precisely what occurs with the premonitory cases in the table.

I believe that very few of this latter class of cases escaped the visitors; that hardly any that were discovered passed into cholera, and the obvious inference is, that the cholera cases reported in the latter part of the table must have been either sudden, imported, the result of obstinate personal neglect, or of intemperance. To one or other of these causes is to be attributed the remnant of cases which appears in the schedule, while the great bulk were arrested.

In order to make the data in the table more striking to the eye, I have placed them in the diagram Plate 8 (see Report, p. 99), where the black line represents the premonitory cases and the red line those of cholera.

The evidence in this instance as to cause and effect is as strong as the case admits of, and I think perfectly conclusive.

RETURNS of Premonitory Cases and Cholera in the Town of Dumfries, during the House-to-House Visitation, 1848-49.

DATE.	Number of Visitors.	Premonitory Cases.		Cholera.			DATE.	Premonitory Cases.		Cholera.		
		Premonitory Cases Discovered.	Total under Treatment.	New Cases.	Deaths.	Recoveries.		Premonitory Cases Discovered.	Total under Treatment.	New Cases.	Deaths.	Recoveries.
1848.							1848.					
Dec. 10	1	..	..	37	9	..	Dec. 30	25	84	2	..	..
" 11	2	..	..	38	6	5	" 31	3	38	2	..	..
" 12	4	..	..	23	9	9	1849.					
" 13	12	Premonitory Cases discovered: Average from 38 to 40 a day.		11	7	2	Jan. 1	10	51	..	1	1
" 14	13			14	3	5	" 2	8	50	3	..	..
" 15	13			12	6	2	" 3	9	28	..	..	..
" 16	13			8	6	10	" 4	15	42	..	..	..
" 17	13			4	4	5	" 5	3	28	..	..	2
" 18	14	From this date onwards.		2	5	1	" 6	3	18	..	..	2
" 19				3	5	..	" 7	3	16	..	..	..
" 20				..	3	2	" 8	7	25	..	..	1
" 21				..	2	6	" 9	4	17	..	..	1
" 22				..	3	..	" 10	..	10	1	..	..
" 23				2	1	..	" 11	..	..	..	..	..
" 24				..	2	2	" 12	1	7	1	..	..
" 25				2	2	1	" 13	2	13	..	..	..
" 26				1	1	..	" 14	2	14	..	..	..
" 27				2	2	..	" 15	1	11	..	..	..
" 28				2	..	..	" 16	2	15	..	1	..
" 29				3	..	2						

II.—REPORT ON THE MEASURES ADOPTED FOR THE RELIEF OF CHOLERA IN GLASGOW DURING THE EPIDEMIC OF 1848-9.

Section I.—Preventive Measures.

ON or about the 5th of November, 1848, an imported case of cholera occurred in Glasgow. The patient, a working man, had gone to the village of Loanhead near Edinburgh, where the disease was very fatal, to visit a relative who died from an attack. He remained only a few hours in the village and returned to Glasgow, where he was taken ill in a house in Garnkad-road to the north of the city. This case proved fatal, but none of the attendants suffered, neither was there any connexion between it and the subsequent epidemic seizure.

Nearly two miles to the west of this locality, there is a district that may be considered the epidemic centre of Glasgow. It is a straggling suburban village situated to the north-west of the city, and an inexperienced eye might fail to detect those peculiarities which render it a dangerous neighbourhood. It lies along the Forth and Clyde Canal, which is here carried at a high level, and the moisture percolates through the bank, so as to keep the whole subsoil charged with water; which accumulates in middensteads and other hollows. There are besides several old quarries filled with offensive water, and other similar

nuisances. The houses have neither drainage nor domestic conveniences and the inhabitants consequently habitually breathe an impure and unwholesome atmosphere. Similar conditions have always accompanied the most violent epidemic outbursts in other places, and from this one unhealthy neighbourhood, three epidemics had commenced their career within a short time before the cholera began.

Late at night on the 11th November, two individuals, a male and a female, residing on the ground flat of a damp house in the district, close to the canal were seized with severe diarrhœa, which they both allowed to go on unchecked till the 13th. The medical officer on being called in found the man in a state of profound collapse, in which he died next morning. The woman then fell into collapse, and also died. Both of these cases were purely epidemic, for neither of the patients had been near any one affected by the disease. Simultaneously with the occurrence of these cases in the part of the district within the city parish, another case appeared in the portion belonging to the barony parish, which proved fatal on the 13th. On the 14th, 15th and 16th three other cases took place in this last-named portion, and on the 17th the third case in the city parish occurred at the village of Springbank, situated below the level of the canal, and at a considerable distance from the first two cases. This patient, a man of dissipated habits, had neither been in an affected locality, nor had communication with any one suffering under the disease. A number of cases took place within a few days after this date, and Dr. Adams the parochial surgeon of the district, states, that no communication could be traced between the parties, and that 21 cases actually occurred before he saw an example of two persons *consecutively* attacked in the same house, or even in the same lane. The succeeding nine cases took place without communication; so that the evidence goes to show that the disease was purely epidemic in its appearance. In 13 instances relatives lay in the same bed with the sick without being affected. In 9 cases, children were suckled by women labouring under the disease, and yet not one of them was attacked.

The epidemic was chiefly confined to this locality during the remainder of the month of November, and about 40 cases took place in the neighbourhood, before the disease began to show itself in the more densely peopled parts of Glasgow. A few dropping cases nearly equally scattered occurred in the urban districts of the city and barony parishes, for some days before a decided epidemic outbreak took place.

From Springbank and its vicinity the epidemic appears to have spread, as from a centre, towards the east, west, north, and south. On the 5th of December a case occurred south of the Clyde, and on the 9th a case was reported in the west end of Glasgow; and within a few days after this period, the epidemic attacked the whole city, falling upon it like a thunder shower, producing results that baffled all calculation, and setting all existing arrangements at defiance. The maximum period of the attack extended from the 24th to about the 29th of December, the largest number of deaths occurring probably on the last of these days; for on the 30th no fewer than 158 burials, of persons stated to have died of cholera, took place. A subsidence next occurred for a day or two, but immediately after the dissipation of the new year, as was to be expected, a vast augmentation again ensued, and on the 5th of January

no fewer than 235 cases were reported. From this period the disease declined irregularly; the continuity of the epidemic was broken about the 8th of March, after which only a few dropping cases occurred over the city; but the disease lingered longest in the epidemic centre of Springbank, which furnished about a third of all cases that occurred in the 23 parochial districts after the preventive measures had been withdrawn on the 26th of February.

The peculiar liability of Glasgow to attacks of epidemic disease has led to the adoption of an extensive and well-arranged system for the medical relief of the poor. The city parish is divided into seventeen districts, and the urban and suburban parts of the barony parish into six districts, and over each of these divisions is appointed one medical officer who has an open dispensary at which the poor apply in cases of sickness. There is extensive hospital accommodation for epidemic disease. The Fever Hospital in Clyde-street is capable of receiving 200 cases, and that attached to the Infirmary, from 200 to 250 cases; but the distance of these establishments from many of the localities affected by cholera rendered it necessary to open other two temporary hospitals, each capable of containing 12 beds. One of these was situated at Woodside and the other at Bridgeton at the opposite extremities of Glasgow.

In compliance with the regulations of the General Board of Health, the city parochial authorities opened a House of Refuge in Clyde-street, capable of accommodating 280 persons, and another was opened at Bridgeton by the barony parish. This latter had beds for 200 inmates.

The violent outbreak of cholera in the town of Dumfries rendered it necessary for me to proceed thither before the arrangements in Glasgow were completed. I had, however, previously made an attempt to organize a system of house-to-house visitation by lay agency, and by the aid of the City Missionaries, but without success.

As soon as the very striking advantages of the system of medical visitation carried out in Dumfries, in conformity with the special regulations of the General Board of Health, became apparent, I was instructed to organize a similar plan in the affected parts of Glasgow. I, accordingly, conferred with the parochial authorities and their medical officers. All parties seemed desirous to give the system of visitation a fair trial, and, after due consideration, I deemed it expedient to base the preventive measures on the existing system of medical relief, rather than to lose time by organizing another machinery. The two parishes affected had 23 medical officers in their employment. The places of business of these officers were well known to the people, and could be at once converted into district *day* dispensaries for the relief of persons affected by diarrhoea or other premonitory symptoms; and I found that arrangements could easily be made by which an adequate number of night dispensaries could be opened at convenient distances from each other. The arrangements might have been more effective had the district surgeons given their whole time and attention to cholera cases, but this was impossible.

The annexed map exhibits the arrangements adopted. It shows the boundaries of the 23 districts, the position of the day and night dispensaries, the cholera hospitals and Houses of Refuge; and it also points out the centre from which the epidemic radiated, and the chief localities

affected. The extent covered by the epidemic is indicated by the diagonal lines, and its force by the comparative proximity at which the lines are placed.

In casting the eye over the map, the different sizes of the districts are very striking. They may be taken as the exponents of the sanitary and social condition of the people. The present arrangement is the result of experience, and speaks volumes as to the misery, vice, and disease which are concentrated within small spaces in our larger cities and towns. The healthy districts cover the largest spaces of ground, and have their poorest classes and neighbourhoods at considerable distances from each other; yet the labour of the medical officer is not greater in superintending such large areas of population, with all the time spent in going over them, than it is in those frightful abodes of human wretchedness which lay along the High-street, Saltmarket, and Briggate, and constitute the bulk of that district known as the "Wynds and Closes of Glasgow." It is in these localities that all sanitary evils exist in perfection. They consist of ranges of narrow closes, only some four or five feet in width, and of great length. The houses are so lofty, that the direct light of the sky never reaches a large proportion of the dwellings. The ordinary atmospheric ventilation is impossible. The cleansing, until lately, was most inefficient, and, from structural causes, will always, under existing arrangements, be difficult and expensive. There are large square middensteads, some of them actually under the houses, and all of them in the immediate vicinity of the windows and doors of human dwellings. These receptacles hold the entire filth and offal of large masses of people and households, until country farmers can be bargained with for their removal. There is no drainage in these neighbourhoods, except in a few cases; and from the want of any means of flushing, the sewers, where they do exist, are extended cesspools polluting the air. So little is house-drainage in use, that on one occasion I saw the entire surface of a back yard covered for several inches with green putrid water, although there was a sewer in the close within a few feet, into which it might have been drained away. The water supply is also very defective; such a thing as a household supply is unknown, and I have been informed, that, from the state of the law, the water companies find it impossible to recover rates, and that, had the cholera not appeared, it was in contemplation to have cut off the entire supply from this class of property.

The interior of the houses is in perfect keeping with their exterior. The approaches are generally in a state of filthiness beyond belief. The common stairs and passages are often the receptacles of the most disgusting nuisances. The houses themselves are dark, and without the means of ventilation. The walls dilapidated and filthy, and in many cases ruinous. There are no domestic conveniences even in the loftiest tenements, where they are most needed, except a kind of wooden sink placed outside some stair window, and communicating by a square wooden pipe with the surface of the close or court beneath. Down this contrivance, where it does exist, is poured the entire filth of the household or *flat* to which it belongs, and the solid refuse not unfrequently takes the same direction till the tube becomes obstructed. In Edinburgh it is no unusual thing for the whole refuse, solid and fluid, to be tossed out of the windows into the closes below, and this in spite of Acts of

Parliament and police regulations centuries old. The necessities of nature are stronger than any police laws, and will always set them successfully at defiance.

I have met with cases where the sights and smells in all parts of the house were sickening, and, in one instance, a decent poor man stated, that the interior of his house was so very wretched, that he shut the window-shutter of his only window in order that his feelings might not be injured by the neighbours casting a passing look through it.

Another matter connected with these districts, and their peculiar liability to epidemic disease, is the great and continually increasing overcrowding that prevails. I have been credibly informed, that for years a population of many thousands has been annually added to Glasgow by immigration without a single house being built to receive them. The great proportion come from Ireland. Every cabin in that wretched country that is razed to the ground sends one or more families to find house-room in the cities of England and Scotland, and of this element of disease Glasgow obtains its full share. A great proportion of these poor people are young men and women in the prime of life. They come from the fresh country air, and a diet just sufficient to support health in it, to inhabit for a time those wretched dens of misery, disease, and death, the low lodging-houses. It is only, however, for a time; for a diet still further reduced, and a pestilential atmosphere, do the rest. The young and healthy soon become the prey of epidemic disease, and their deaths go to swell the catalogue of those who have been prematurely cut off by typhus. Others again, driven by sheer necessity and the vile examples they meet with, find their way to the prison and the convict ship; and not a few young women virtuously brought up in their native parishes in the Highlands or in Ireland, are seduced, ruined, and abandoned to prostitution and an early grave. Such are the notorious results of the social system at present in operation in Glasgow and other large cities. The overcrowding and wretchedness of late years has brought typhus with it, a disease that not long ago was almost as rare in the large cities of Scotland as ague now is; and wherever typhus has prevailed, there cholera now prevails, or has done so recently.

These observations on the sanitary condition of affected parts of the districts of the *city* and *barony* parishes will give some idea of the localities and habits of the people where the preventive measures for arresting cholera have been put in force, and of the difficulties which had to be encountered. The entire population of the *city parish* is about 152,000, and of the six districts of the *barony parish* about 127,000.

As soon as the arrangements were completed, a code of instructions, drawn up in conformity with the special regulations of the General Board of Health, was printed and placed in the hands of the superintendents and visitors. It will be found in the Appendix.

The visitors employed were advanced medical students, who were selected for the work because it was considered that the peculiar circumstances of Glasgow, being a university city, and the seat of a medical school, would make the system of *student-visitation* easy to carry out, on account of the facility with which qualified young men could be obtained. At a subsequent period an important modification of the plan was effected in a part of the barony parish, by the substitution of lay

visitation. The following details will show the extent of the agency employed in both parishes :—

General superintendents	.	.	.	2
District medical superintendents	.	.	.	23
Medical visitors, city parish	.	.	.	40
Medical visitors, barony parish	.	.	.	28
Houses of Refuge	.	.	.	2
Cholera hospitals	.	.	.	4
Day dispensaries	.	.	.	26
Night dispensaries	.	.	.	13

The dispensaries were open to all necessitous applicants without any order, and properly qualified medical officers were placed in charge of each night dispensary, and stationed at the various hospitals in readiness to give immediate attention to applicants for relief and reported cases.

A separate notice was printed for each of the twenty-three districts of the two parishes, and extensively distributed in the poorer neighbourhoods. It was intended to give the people full information as to the measures which were being taken for their protection, to disarm prejudice, and to give a few needful cautions in regard to personal habits, and the necessity of attention to the premonitory symptoms of the disease.

As the obtaining of statistical data was of essential importance to the working of the preventive measures, three sets of schedules were provided. The following is the form which was adopted for the use of the visitors :—

VISITOR'S SCHEDULE.

No. of District.	No. of Sub-District.
Name of Visitor,	
Date,	
Hour visitation when commenced to-day	
Hour visitation when concluded to-day .	
Number of houses visited	
New Cases of Simple Diarrhœa, discovered during the visit	
New Cases of Diarrhœa, with Rice Water Purging, discovered during the visit	
Cases of Cholera discovered during the visit	
Number of Cases of Diarrhœa or Rice Water Purging, which have passed into Cholera since last visit, distinguishing each separately	
Number of Houses reported after the visit as requiring cleansing	

Signature of Visitor.

The Superintendent of each district met his visitors at a stated hour in the evening, and received from each a copy of this Schedule filled up ; he then transferred the aggregate of the details along with certain other information, into his own return, of which a copy is added.

DISTRICT SUPERINTENDENT'S RETURN.

No. of District,
 Name of Superintendent,
 Date,
 Total Premonitory Cases which have
 applied at the District Dispensaries
 since yesterday }
 Total Cases of Simple Diarrhœa, re-
 ported by the Visitors in the District,
 since yesterday }
 Total Cases of Rice Water Purging, re-
 ported by the Visitors in the District,
 since yesterday }
 Total Cases of *Simple Diarrhœa* or *Rice*
Water Purging, which have passed
 into Cholera in the District, since yes-
 terday, distinguishing each sepa-
 rately }
 Total New Cases of Cholera in the Dis-
 trict, since yesterday }
 Total Deaths from Cholera in the Dis-
 trict, since yesterday }
 Total Recoveries from Cholera in the
 District, since yesterday }
 Total Cases of Cholera under treatment .
 Total Houses in the District reported as
 requiring cleansing, since yesterday . }

Signature of District Superintendent.

At the evening meeting of the District Superintendents, the General Superintendent of each parish took the chair, and a general Schedule, showing the progress of the disease in each separate district, was filled up under the following heads, and a copy forwarded to the General Board of Health:—

GENERAL SCHEDULE for Cases of Premonitory Diarrhœa, and Cholera, in
 the Parish of Glasgow.

Return from									p. m.		to		p. m.	
DISTRICTS.	PREMONITORY CASES. Since last Report.			CHOLERA.					Premonitory Cases passed into Cholera.					
	Dispensary Cases.	Simple Diarrhoea.	Rice-water Purging.	New Cases since last Report.	Deaths since last Report.	Recoveries since last Report.	Under Treatment.							
1														
2														
&c.														
Date.									Reporter.					

The second and third columns of premonitory cases comprehend those discovered and treated by the visitors.

Two sets of Schedules were prepared for notifying instances in which cleansing either external or internal was required. Those for street cleansing, the removal of nuisances, &c., were sent to the police; and

the Schedules for the cleansing, lime-washing, or fumigating of affected houses, were forwarded to the cleansing staff of the parishes.

A system of sanitary inspection was introduced into the large manufacturing, by the aid of the Secretary of State, with the view of detecting and treating immediately all premonitory cases that might occur among the work-people—a measure that was productive of much benefit.

Besides the spread of the epidemic among the poorer classes in Glasgow, a number of fatal cases took place among persons in the better ranks of life. It appeared that in nearly all those cases a distinct premonitory stage had existed without attracting attention till it was too late, and, in order to prevent such occurrences as far as possible, very strong expressions of opinion as to the necessity of early attention to the premonitory signs, were given at the meetings of the District Superintendents, and reported in the newspapers. But it appeared to be necessary to attract public attention still more forcibly to this matter, and with this view a letter was addressed to the Lord Provost of the city, and with his concurrence inserted in the newspapers.

In one of the districts of the barony parish an attempt was made to carry out the visitation system by a voluntary unpaid lay-agency, but it was soon given up. In another district, however, that of Bridgetown, a local committee of the Parochial Board undertook to provide lay-visitors at 2s. 6d. per diem; the district was divided into four wards, over each of which one qualified practitioner resident in the place was appointed. The population is about 17,000, and 14 lay-visitors were deemed sufficient to undertake the visitation. The medical officer of each ward was required to devote his whole time to the treatment of diarrhœa or cholera cases which might be discovered within his district, and he was also required to do a certain amount of visitation. The whole machinery was under the guidance of Dr. Burns, the District Superintendent, who met the medical officers and visitors every evening, and received from them an account of the work done during the day. A copy of the results was entered in the general daily schedule of the barony parish. Each day the lay-visitors inspected, on an average, 2,500 houses, and immediately reported all the cases of cholera or its premonitory symptoms discovered in the ward to the proper medical officer. They also reported at the evening meeting every house, &c., in the district where cleansing was required. In this way no fewer than 700 courts, lobbies, closes, houses, and fronts of buildings were reported and cleansed; and it was remarked, that Bridgetown had never before been so clean or so free of disease as when the cholera began to decline. No fewer than 413 cases of diarrhœa, and 183 choleraic cases with rice-water purging, were discovered and successfully treated; only two being reported as having passed into cholera.

A soup-kitchen was established in Bridgetown by the local Board of Health; and it is a striking fact, that of all the persons who were recipients of its bounty, not one was attacked either with diarrhœa or cholera. It is remarkable, also, that the factory operatives enjoyed a greater exemption from attacks of cholera than any other class of work-people. This circumstance is attributable partly to the better sanitary condition of the dwellings and places of work of this class of operatives, and partly, no doubt, to the system of inspection which was introduced

into the factories, for the purpose of discovering and treating premonitory cases.

The carrying out of the whole of the parochial relief measures was placed in the hands of the two General Superintendents,—Dr. Lawrie, consulting physician to the city parish, acting for that parish, and Dr. Dempster, undertaking the like duty for the barony parish.

I cannot conclude this part of the report without expressing my high sense of the great ability and energy with which the visitation system was carried out by the medical officers of the Parochial Boards; and of the obligations which the city of Glasgow is under to Dr. Francis Steel for the amount of labour he bestowed on keeping the statistics of the disease; and I think it only an act of justice at the same time to express my conviction that, whether we consider the extent of the machinery employed during the late fearful epidemic or the zeal with which it was sustained by the most active members of both Boards, or the expense cheerfully incurred by them during a period of great pecuniary difficulty in parochial affairs, no provision more munificent was ever made for the relief of a great public calamity, than that carried out by the humane and enlightened citizens of Glasgow. But, while I willingly bear this testimony to the good which has been done, a sense of public duty requires me to express my conviction that those epidemics which have so frequently devastated Glasgow and other cities and towns in Scotland, are not to be met by such temporary measures as those now described. Nothing short of permanent sanitary improvements, of a very different kind from any hitherto carried out, will be sufficient to save the lives of the poor, and to protect the public from the heavy local expenditure arising from preventible disease.

Section II.—Results of the Preventive Measures.

The objects aimed at by the system of house-to-house visitation introduced into Glasgow were:—

1st. To prevent persons who might not apply for medical aid, even in cholera, from dying without such aid.

2nd. To seek out neglected cases of cholera, so as to bring them under treatment at the earliest possible period, and thus diminish the mortality of the epidemic.

3rd. The discovery and immediate treatment of every case of diarrhoea, in localities where cholera prevailed, and where the patients had not applied at the dispensaries, in order to prevent, as far as possible, the development of the disease.

4th. To keep a constant medical inspection over affected districts and houses, to insure their being preserved in a proper sanitary condition.

5th. To exercise a moral agency over the population, by giving such instructions in regard to cleanliness, ventilation, and personal habits as might appear needful, and by explaining and enforcing the necessity for immediate application to the dispensaries or medical officers by all parties who might be taken ill during the intervals between the daily visits.

I next proceed to show the extent to which these various intentions were fulfilled.

The house-to-house visitation was begun by the student visitors of the city parish on the 26th and 27th December, and by those of the barony parish a day or two later. At this period the epidemic was about its acmé; although in the course of the next week or ten days, a vast number of cases occurred, after the revels of the new year, and in consequence of the drunkenness then prevalent.

The very first result of the visitation was the discovery of a number of corpses of persons who had died apparently without medical aid. In the city parish alone, no fewer than 51 such instances occurred; but there is reason to fear that such deaths were most numerous during the period of the epidemic immediately preceding the introduction of the visitation system, and the burials of these persons have, no doubt, gone to swell the list of those who died either unattended, or of whose illness and medical treatment no record can be obtained.

The visitors also discovered a considerable number of cases of developed cholera. One gentlemen stated that, for several days, he had found about a dozen such cases a-day, in none of which he believed the patients or their friends would have applied for medical aid. A very large number of premonitory cases in various stages of progress were also discovered; but as several days elapsed before the necessary schedules could be placed in the hands of the visitors, no account of the earlier cases has been preserved, and it was not until the 31st December, that a regular report could be obtained from all the districts. It was as follows:—

PARISHES.	Applicants at Dispensaries.	Diarrhoea Cases discovered by Visitors.	Rice-water purging Cases discovered by Visitors.	Cholera Cases.
City . . .	34	72	13	31
Barony. .	60	72	22	37
Total .	94	144	35	68

The first return thus shows 273 diarrhoeal cases brought under treatment, 35 of which were closely bordering on cholera. As the visitation became more effective, and the people were better acquainted with the objects in view, through the instructions of the visitors and the printed notices issued, the amount of applicants at the dispensaries, and also of cases discovered, progressively increased, the parts of the preventive machinery acting efficiently together.

The early treatment of cases of developed cholera discovered by the visitors produced a very marked effect upon the comparative mortality of the disease. Table I. gives the parochial statistics of the entire epidemic from the first to the last case, and by deducing from it the percentages of deaths and recoveries for each week the following results are obtained. During the first four and last three weeks of the epidemic the number of cases was not very large, and I have therefore grouped them together at each extremity of the table.

Report on Cholera in Glasgow.

	Percentages of Deaths.	Percentages of Recoveries
Four weeks ending December 9 . . .	53.4	46.6
Week ending December 16. . .	60.5	39.5
" " 23. . .	60.0	40.0
" " 30. . .	51.7	48.3
" January 6. . .	50.0	50.0
" " 13. . .	40.7	59.3
" " 20. . .	34.8	65.2
" " 27. . .	35.0	65.0
" February 3. . .	31.5	68.5
" " 10. . .	37.8	62.2
" " 17. . .	22.2	77.8
" " 24. . .	38.0	62.0
Three weeks ending March 17. . .	36.5	63.5

The first neglected cholera cases were discovered by the visitors on the 26th of December, when the epidemic was almost daily attacking new localities. Although it is a law of the disease to decline in severity as it declines in numbers, it showed, certainly, no tendency at that time to do either, and I am, therefore, decidedly of opinion that the greatly diminished mortality which this table exhibits immediately after the introduction of the visitation system, is mainly to be attributed to the discovery and early treatment of the cases. The marked numerical increase of cholera cases shown in Table I. is also to be referred to the same agency. A great number of attacks, of which no record would ever have been obtained except from the burial-ground registers, were discovered by the visitors, and the addition of these to the daily returns is the reason why the statistical effect of the preventive measures was apparently less than it was in reality.* Table I. gives a daily return for both parishes; and Table II. the total number of cholera and premonitory cases which occurred in each of the districts during the continuance of the system of visitation. I have transferred the daily returns of premonitory cases and cholera for the entire epidemic to Plates 9 and 10, which exhibit in another form the enormous amount of premonitory cases brought under treatment by the preventive measures adopted.

The following are the general results of the preventive measures for the city and barony parishes:—

PARISHES.	PREMONITORY CASES.				CHOLERA.	
	Applicants at Dispensaries.	Diarrhœa Cases Discovered.	Rice-water Purging Cases Discovered.	Total Premonitory Cases Treated.	Premonitory Cases passed into Cholera.	Cholera Cases.
City . .	3,066	2,736	473	6,215	15	1,231
Barony .	3,113	3,255	506	6,874	12	1,003
Total .	6,119	5,991	979	13,089	27	2,234

* As a striking illustration of this fact it may be stated that in the week preceding the introduction of the house-to-house visitation, that is, while the people were left to apply for medical aid, the deaths, as deduced from the recorded burials of persons who had died of cholera, amounted to 829, while the total cholera cases for whom application had been made was only 446, or little more than half the deaths. In the first week of the visitation, when the cases were sought out by the medical officers, their numbers rose from 446 to 714, and the deaths fell from 829 to 699.

The large proportion of premonitory cases in these tables, when compared with the very small number which passed into cholera, affords a striking and conclusive proof of the utility of directing the treatment against the early stages of the disease.

It is certainly a most remarkable fact, that out of above 13,000 premonitory cases, nearly 1,000 of which had advanced so far as the rice-water purging stage, only 27 should have passed onwards to cholera. Table III., which includes the dispensary cases as well as those discovered by the visitors, shows the ratio existing between the premonitory cases and those of cholera, for each day during the continuance of the preventive measures.

It will be seen that throughout the entire districts under visitation, the proportion of the premonitory to the developed cases amounted to nearly 600 per cent.; in the city districts it was 504 per cent., and in the Barony districts 685 per cent.; but when the districts are taken individually, the proportions are still more striking. They vary from under 200 per cent. to above 2,000 per cent.; and in one instance (Barony District, No. 1.), the premonitory cases amounted to the enormous cypher of 2379 per cent. of the cholera cases. During particular days in the course of the epidemic, a much larger proportion of diarrhœa and other premonitory cases were discovered than during others. This partly arose from the greater comparative success of the visitation, and also partly from the course which the disease happened to take at the particular period. The per centage of premonitory cases on these occasions rose as high as 2,000, 2,800, 3,700, and on one day, in the Barony parish, it was 3,850 per cent. of the cholera cases. The tables and diagrams show that the visitation attained to efficiency during the first week of January, and that the diminution of cholera cases was rapid after that period.

The total number of premonitory cases treated during the continuance of the house-to-house visitation, from December 31st, 1848, to February 26th, 1849, inclusive, amounted as has been stated, to 13,089; and if to these be added the number of unreported cases already alluded to, it is not improbable that about 15,000 such cases were brought under treatment by the parochial medical officers and visitors. During the height of the epidemic, indeed, all Glasgow appears to have been affected. The number of cases treated by private practitioners also was very large. One gentleman prescribed for about 1,100 in the denser parts of the city, and many cases of diarrhœa occurring in the better portions were found to be extremely obstinate in their character. It is to be feared, that among the richer classes, not a few lives were lost by delay in applying for medical aid.

The peculiar difficulties attending the introduction of the preventive measures into Glasgow have been already adverted to, and although the district superintendents bear decided testimony to the zeal with which the student visitors executed their beneficent work, they at the same time complain of the low moral state of the people and of the difficulties which were experienced from this circumstance. I am afraid that much of the mortality which occurred, notwithstanding all that could be done, is to be attributed to the reason referred to. There is abundant evidence to prove that a great many lives were saved, but the statistics of the early history of cholera cases furnished by the superintendents

nevertheless show that out of 1,390 cases, 927, or nearly 70 per cent., had a premonitory stage of more than six hours' duration; in 221, or under 16 per cent., this stage was of less than six hours' duration, or was absent; and in 197, or about 14 per cent., the facts were not ascertained.

There was thus a very large proportion of the attacks which admitted of being brought under treatment at a period preceding the full development of the disease, had the people willingly availed themselves of the means of safety so freely placed at their disposal. All that could be done was to attempt to save as many lives as possible.

I now subjoin the opinions of a number of able and intelligent medical officers employed in the work of superintendence in the city and barony parishes, as to the results which have, in their estimation, accrued from the visitation system.

The first of these is from Dr. Dempster, staff surgeon, who acted as general superintendent of the barony parish. He states that he has served for 23 years in India, and has had ample opportunities of becoming acquainted with the disease, and that the military authorities adopted stringent measures for the discovery and treatment of its earliest symptoms.

"The result of this practice," says Dr. Dempster, "was most satisfactory; and that the measures above stated are absolutely necessary, I feel perfectly convinced from having had so frequently to lament the infatuated carelessness of soldiers, and the lower orders in civil life on several occasions, for days together neglecting the premonitory diarrhœa, and not applying for medical aid until the urgent symptoms of cholera had made their appearance, and then only at a period of the disease when treatment proved of little avail. My experience of cholera, as it occurred in the barony parish during the late epidemic, has only tended to confirm the belief already expressed—that to be of service in cholera, medical aid must be directed against the premonitory stage; and I feel convinced that the only mode of obtaining this favourable end is by the system of house-to-house visitation, as lately introduced into Glasgow. By its means numberless cases of diarrhœa, which would otherwise have been totally neglected, were detected, and, by suitable treatment, promptly arrested: and in the district where the system of medical or lay visitation was most energetically carried out, and the sanitary measures strictly enforced, the good effects were at once manifested in the daily reports, by a great increase of diarrhœa cases, with a proportionate decrease of those of cholera; whilst, at the same time, the proportion of deaths in the latter underwent a considerable diminution, evidently from the visitation system having brought the cases sooner under treatment."

City District No. 1.—Mr. John Leitch says, "I am perfectly satisfied that in Glasgow and other large towns, it (the visitation) will not succeed so effectually as in smaller ones, in consequence of the great want of confidence reposed in the visitors." Mr. Leitch, at the same time, states that few, if any, cases of diarrhœa have passed into cholera after having been seen by the visitors.

District No. 2.—The following statement is made by Mr. J. Johnston. "Judging from the experience of a fortnight, I have no hesitation in giving it as my opinion that the system of house-to-house visitation has

proved very useful in modifying the progress of the present epidemic. Many cases of diarrhœa have been discovered which there can be little doubt, but for the visitors, would have been allowed to go on unheeded. By the same instrumentality, also, various nauseous nuisances have been caused to be removed, which otherwise might have passed unnoticed."

District No. 3.—The superintendent, Dr. John Boag, states that the population, most part Irish, are so exceedingly migratory that "you will scarcely see the same individuals from week to week." He complains, also, of their low moral condition, but goes on to say: "I think the system of house-to-house visitation (although, for reasons I have given, not applicable to the population under my charge) complete as a preventive of cholera in a favourable locality, that is, among a population whose word can be depended upon. I have found this the case so far as the better class of district patients in my district is concerned, but who, I am sorry to say, form a small proportion."

District No. 4.—Dr. Alexander Lindsay says, "I have no doubt but this system much assists in preventing the spread of cholera."

District No. 5.—Dr. Dickson reports as follows:—"I consider the house-to-house system of great benefit, and that my young men were zealous in the discharge of their duties, and that they also accomplished the work. In country towns I consider it will be of greater benefit than in a city such as Glasgow; but with all the disadvantages it labours under, I have no hesitation in saying that it has been a great mean of preventing cholera by discovering and checking the disease in the diarrhœal and rice-water purging stages."

District No. 6.—Mr. A. Fergus says, "I think that visiting every house is the only plan on which we can place any dependence for checking the progress of cholera. * * * Only one case of diarrhœa discovered by the visitors passed into cholera. The man would not be persuaded he was ill, and refused to take any medicine. At the visit next morning the diarrhœa had passed into cholera."

District No. 7.—Mr. James Campbell reports, "Before the commencement of household visitation no cases were seen in my district except those which had passed into cholera. The number of these was about 100. Most of them had had diarrhœa some days, and passed into cholera about the hour of midnight or mid-day. After the visitation system commenced, in one day, if my memory serves me right, 27 cases of diarrhœa were detected, which would next have passed into cholera. * * * At the dispensary, during the past three weeks, upwards of 1000 cases have applied. For some days they were so numerous that the numbers could not be taken. The visitation system and open dispensaries, in my opinion, have been, under the blessing of God, the means of saving many and valuable lives."

District No. 8.—Mr. James Glass considers the system of visitation impracticable in the city of Glasgow; but states, at the same time, that not above five cases of diarrhœa have passed into cholera in his district after having been seen.

District No. 9.—Mr. J. W. Black, after stating that the visitation system had "not met with that fair play on trial to which it is entitled," on account of difficulties arising from the moral and physical condition of the population in his district, goes on to say that he has much confi-

dence in supposing that whenever it is possible to be put into fair and complete operation success will in general attend it.

District No. 10.—Mr. G. Rendall says, “I have just time at present to express my high approbation of the machinery put in motion to arrest the progress and diminish the dreadful ravages of cholera in this city. The maxim, ‘Prevention is better than cure,’ cannot be better illustrated than in the case of cholera; but I know of no other means so well adapted to the end as the vigorous working of the admirable system which has been instituted. I am not able at present to advert to a single case in which cholera (properly so called) supervened after its premonitory symptoms had been timely and energetically treated. I am as confident that an immense amount of suffering has been prevented and an immense number of lives saved by it, as I am of the truth of any demonstrable fact with which I am acquainted.”

District No. 11.—Mr. James Harvey reports, “I am of opinion that the present mode of house visitation has been very successful in my district, in finding out and checking cholera in its premonitory symptoms. It has gradually declined, and for the last four days there has not been above one new case of cholera daily.”

District No. 12.—Dr. Fisher says, “I would answer, unhesitatingly, that I know no more *efficient* agency that could be employed than the visiting of properly qualified students. In my own district (containing a population of between 20,000 and 30,000 inhabitants) *it has worked well.*”

District No. 13.—Dr. J. M. Adams states in regard to the visitation, “that in no other way can a large proportion of cases, and especially of the incipient stages of cholera, be brought under notice or under medical treatment; that in the existing state of sanitary arrangements in large towns, it will prove one of the most effectual means of breaking the force of an epidemic, and that under all circumstances it is likely to limit the spread of disease, and to diminish the mortality.” After expressing his opinion that the machinery was, to a certain extent, imperfect, he goes on to remark, “But as it is, cases of cholera have been discovered which were fully developed in the symptoms, or were collapsed, or were actually dead, which had not undergone medical treatment, and which would not otherwise have been brought under medical notice; and numerous cases of disorders of the general health, believed to be premonitory of cholera, have been brought under effective medical treatment.”

District No. 14.—Dr. Walker states, that, on the whole, “the system of visitation does not produce the good it would appear to do at first sight.” Although he also states that his visitors are “very zealous, and seem well adapted for the service,” and that they “generally stop diarrhoeal cases from becoming cholera.”

District No. 15.—Mr. Menzies says, “Hitherto the system has worked tolerably well, in so far as the diminution of patients in the previously affected localities and their limitation in those then unaffected is concerned. * * * On fully considering the system, as at present applied in the 15th district, I have come to the conclusion, that it has been of very considerable benefit to its population.”

District No. 16.—Mr. John McElleran reports, “From my experience of the system, I can say that it is a sure and easy method of

checking the progress of cholera, and with total abstinence would render the miasma almost harmless."

District No. 17.—Dr. A. M. Adams reports generally in favour of the system, as he then had had experience of it. In a report on the cholera within his district since received, Dr. Adams writes, "The last and, in my opinion, the most important step, taken for the purpose of arresting the ravages of the disease, was the system of house-to-house visitation, instituted about the end of December. In my district this led to the most beneficial effects. During the course of the visitation they (the students) discovered immense numbers of diarrhœal affections. For the treatment of these they carried appropriate medicines, which they administered on the spot. In several instances they learned that some members of the families they were visiting, and who happened to be out at the time, were affected with looseness of the bowels; for these they left simple but efficacious remedies, such as opium, chalk, &c. Of all the diarrhœal cases thus *discovered* and *treated*, one only of a *simple*, and three of a *serous character*, went into cholera." Dr. Adams replies to certain cavils against the efficacy of early treatment in checking cholera, in the following words:—"I have called attention, in another part of this report, to the fact, that many cases of cholera, particularly towards the latter period of the epidemic, were heralded in by premonitory diarrhœa. Is there any one who doubts that the disease can be checked in this stage? I do not think so. My own experience leads me to speak very decidedly upon this point; and it therefore appears to me quite logical to conclude that many of the cases of purging, particularly those of a serous kind, discovered by my visitors, would have lapsed into the worst form of the disease, had they not been checked, as it were in the bud, by treatment. The number of cases of true cholera thus prevented, and the lives saved, cannot even be approximately guessed at, but they must have been very great. With facts of this nature staring them in the face, I cannot conceive on what grounds any individuals, whether contagionists, non-contagionists, or contingent-contagionists, can declaim against such a highly important and efficacious system of prevention."

Barony Parish, District No. 1.—Dr. Young says, in regard to the household visitation, "I highly approve of the system."

District No. 2.—Dr. Burns states, "in regard to the plan of lay visitation in use, that it seems to work admirably, and to fulfil all that could be contemplated to arise from the scheme. Since the present machinery began its operations, cholera has gradually decreased in quantity and malignity." After remarking on the large number of diarrhœa cases discovered by the lay visitors, Dr. Burns proceeds to state, "that such cases of cholera as occur amongst us are much milder, and pass sooner into a state of convalescence, with fewer deaths; which I attribute to the cases being earlier seen, and sooner brought under active treatment."

District No. 3.—Mr. Kirk says, "The system is most efficient, and seems to me to be the only one at all likely to be useful as a preventive during the prevalence of cholera."

District No. 4.—Dr. Donald writes, "I have no hesitation in saying, that the system of visitation has done much in arresting the progress of the disease in the district."

District No. 5.—Mr. M'Ewan says, "As stated above, I consider the system as one of signal efficacy for the prevention of cholera; and when the people become better acquainted with the visitors, and have entire confidence in their good intentions toward them, I have little doubt cholera will soon disappear."

District No. 6.—Dr. Miller writes as follows:—"The concealment of the disease in the stage of diarrhœa renders the system ineffectual as a preventive measure, in proportion to the number of cases concealed; yet still the cases discovered, and treated successfully, have been so numerous, as to leave little source for regret; and, unless cholera is preceded by a peculiar diarrhœa not amenable to treatment, we have every reason to conclude that a large proportion of cases have been arrested in their progress to cholera. That there is nothing distinctive in the diarrhœa which precedes cholera, seems evident from the following considerations:—1st. There is no apparent distinction. 2nd. That the great majority of cholera cases are preceded by diarrhœa of from a few hours to ten days' duration. 3rd. That I have known purgative medicine produce rice-water purging and an approach to collapse. 4th. That during a relaxation in the treatment of a cholera case, when the stools have become feculent or apparently so, I have known the rice-water discharges to return, and the other alarming symptoms."

It has been already stated that a system of inspection was introduced into the factories of Glasgow, as part of the preventive measures, by the Secretary of State, at the instance of the General Board of Health, in order to detect the earliest symptoms of disease, and that medicines were provided to be administered on the spot to all affected persons. This inspection was intended to be the supplement to the house-to-house visitation, to ensure, as far as practicable, that persons who might be from home and engaged at the factories when the visitors called at their houses, might nevertheless be duly watched over. I am happy to state that the results of this procedure were most satisfactory. The reports of the three certifying surgeons, Messrs. Fleming, Stewart, and Cunningham, made to Mr. Stuart, Inspector of Factories in Scotland, show that a large number of premonitory cases were brought under treatment in the factories, and that most of the few cases that did go on to cholera had been neglected by the operatives themselves in the early stage.

Mr. Fleming, while remarking on the increasing number of cases of diarrhœa brought under treatment by this means during the week ending February 10th, states, that "many of these have been so severe, as to cause the persons to leave their work. It is gratifying, however, to state that there has been neither death, nor any well-marked case of cholera, although this complaint has prevailed to a considerable extent in some of the localities in which the factories are situated. I have much pleasure in stating that the medicine left at the factories still continues to give the greatest satisfaction; and that but for it, there is every reason to conclude that many of the cases referred to would have ended in cholera."

Mr. Stewart's district appears to have been comparatively free of disease during the period of inspection.

The following extracts from Mr. Cunningham's reports will show the beneficial results arising from this measure. He says, "It is also worthy of remark, that an improved state of feeling is still on the in-

crease amongst them" (the factory operatives). "Fear has to a considerable extent been supplanted by a confidence that danger may in a great measure be averted, by a timely attention on their parts to the first symptoms." * * "I am decidedly of opinion that the extension and continuance of the epidemic have been very much mitigated and checked by the measures in factories, and amongst the population generally, for arresting the first symptoms."

During the late epidemic of cholera, one large house of refuge was immediately opened by the Glasgow city parish, and another by the barony parish. The total number of inmates received into both was 807. These people were chiefly taken from infected houses; and a large proportion of them would doubtless have suffered, had they been left in their homes. It appears, from statistical evidence, that between 30 and 40 per cent. of the deaths from cholera cases in towns take place in houses where more than one person has already died, while entire families have often been swept away. But among the 807 persons removed to the houses of refuge in Glasgow, there were 25 cases of cholera, and only 8 deaths; this small comparative mortality arising, no doubt, from the early treatment brought to bear on the cases. *The house of refuge I consider one of the most important of the preventive measures.*

In conclusion, I would observe that while it is admitted that the present epidemic cholera has shown a tendency to be more severe than that of 1832, the actual comparative mortality in Glasgow has been very much less than on the preceding visitation. In 1832 the population was 203,000; it is now 355,800. The houses which have been built to accommodate this greatly increased population have by no means been adequate; so that overcrowding prevails to a greater extent than it did formerly.

Dr. Strang, the City Chamberlain, has shown that the mortality from cholera in 1832 was 1·4 per cent. of the population, while in 1848-1849 it was 1·06 per cent.; showing a comparative mortality less by 1849 than that of the cholera of 1832.

A consideration of the preceding pages appears to lead to the conclusion that a considerable portion of this great saving of life is, under Providence, to be attributed to the preventive measures of the General Board of Health.

III.—REPORT ON THE MEASURES FOR THE RELIEF OF CHOLERA IN MANCHESTER.

THE township of Manchester is divided into five districts for parochial purposes—Market-street, St. George's, Deansgate, London-road, and Ancoats—and over each of these is placed one medical officer to attend the parish poor. The population in each of these districts, in 1841, was as follows:—

	Population.
The Market-street district	• 27,832
St. George's ,,	• 31,576
Deansgate ,,	• 33,093
London-road ,,	• 28,912
Ancoats ,,	• 42,254
Total . . .	• 163,667

Mr. Noble, the medical superintendent of St. George's district, has addressed to me a published report on the results of the preventive measures adopted in the township, from which I borrow the following sketch of the progress of the epidemic:—

“The first fatal and unequivocal case of Asiatic cholera during the late visitation took place in the Market-street district, in the second week of June; sporadic instances were rumoured for the next week or two, but no other fatal case occurred till the last week of the month, when four cases of death from the disease were registered, three of which were in the Canal-street Hospital, and had been removed from the St. George's district. But slow progress, however, was made by the disease until the latter end of August, when it became decidedly epidemic, and continued to prevail with some severity until the early part of October, at which time a rapid decline took place, exactly coincident with the medical arrangements for combating the malady, organized by yourself during your visit of inspection at the end of September.

“The following table, showing the number of deaths registered in each week for the several districts and for the hospital, will exhibit the course of the epidemic to some extent, commencing with the week ending June 16, and concluding with that ending November 3rd:—

CHOLERA DEATHS registered in the Township of MANCHESTER.

1849. Week ending.	Market street.	St. George's	Deans- gate.	London road.	Ancoats.	Hospital	Total.
June 16	1	..	..	..	..	..	1
„ 23	..	..	..	..	..	..	..
„ 30	..	..	..	..	1	3	4
July 7	..	1	..	..	1	..	2
„ 14	..	..	..	..	..	..	..
„ 21	..	..	..	..	..	1	1
„ 28	1	..	..	1	3	3	8
Aug. 4	2	1	..	..	1	1	5
„ 11	..	1	..	1	2	3	7
„ 18	1	2	1	6	1	3	14
„ 25	1	3	3	2	4	5	19
Sept. 1	3	4	13	4	9	8	41
„ 8	8	8	42	21	18	14	111
„ 15	11	17	32	31	44	32	167
„ 22	9	11	30	35	39	20	144
„ 29	12	24	12	24	42	30	144
Oct. 6	8	9	14	11	42	21	105
„ 13	..	3	11	9	5	3	31
„ 20	1	3	4	3	3	2	16
„ 27	..	..	1	1	3	2	7
Nov. 3	..	1	..	..	..	..	1
Totals.	58	88	163	149	218	152	828

The subjoined reports will illustrate the condition of those parts of the township where cholera localized itself.

MARKET-STREET DISTRICT.—The medical officer, Mr. Golland, states:—

“The Market-street district embraces the centre of the town, comprising the oldest part of it. On looking over the list of cases of cholera

which have occurred, I find that they have been very equally distributed over the district; not that every street has presented cases, but cases have appeared in different localities over almost every part of the district. This may be perhaps accounted for by the fact of the district being enclosed by all the other districts, and by the fact that all the second and third rate streets are very much on an equality as to sanitary conditions, all being paved and sewered, and all equally crowded.

“Half the cases of cholera have occurred in courts and cellars, as was to be expected, for, in the former, there are almost always open privies, &c., the effluvia from which cannot readily find an exit or become diluted; and the latter (the cellars) are generally supplied with an open gully-hole communicating with the drain immediately on the threshold. The exhalations from these are often most offensive, and accumulate in the cellar, for the ventilation of which there is generally no provision whatever.”

“Most of the houses in which cholera appeared were built on the back-to-back plan, or had been made so for the convenience of subletting the rooms as separate dwellings. This mode of closing up the communication between the back and front of a house is very general and very injurious. Where there was a back entrance it was very confined, and served only to admit the vapours from the privies, which are placed immediately contiguous. For any purposes of healthful ventilation it was worse than useless. Indeed, the privies seem to me the one great nuisance in a large and closely built district in the centre of a town like this. The main streets seem free and open, but the back streets and courts, where the poor chiefly reside, are immediately in contact with the back premises of the better class of houses and shops, where the privies and middens are usually placed. It frequently occurs that a court is composed of as many backs of middens as of cottages, the one facing the other. A very low standard of general health amongst the poor is the result, rendering them very prone to fever, and fit subjects for the epidemic of the day, whatever that may be. So long as large quantities of manure are thus left at their very doors as poison generators I fear that no material improvement in their condition can be expected.

“The district is almost wholly supplied with water from the pipes of the Waterworks Company. The water is not, and has not for some time, been of good quality, being hard, impure, and often filled with animalcula. The supply is intermittent, being turned on for an hour each day; one tap at the bottom of a court or at the corner of a street generally serves for several cottages. The water is collected in all kinds of vessels, and left to stand in their close hot rooms until required for use. Of course an unreasonably small quantity is thus obtained, and cleanliness, both of person and dwelling, is at a great discount. There is a lamentable want of ventilation in the houses where cholera has appeared. It is a thing of which the poor themselves seem to have very little idea, and their dwellings are generally so constructed as to render it difficult of accomplishment, even when the necessity for it is pointed out to them. The cellars, particularly, are often highly offensive on this account, being very low over head, and having no outlet but the door. The drainage of the district has been much improved of late years; indeed almost every street is sewered and paved.

There is a deficiency of house-drains, however, and in consequence it is quite usual to see women emptying the chamber utensils, &c. in the gully-hole in the street, and, if that is not opposite the door, into the gutter. When there is a house-drain it is frequently of little use, as the houses are often sublet in rooms, so that only one family may have access to the sink where the drain happens to be placed. Most of the inhabited cellars have drains, but they are generally so placed and constructed as to be a positive nuisance and cause of disease instead of an advantage. The district has a river frontage on one side only, formed by the Irk and the Irwell, both of which, but *particularly the former*, are filthy and offensive in the extreme, partly from receiving the contents of the drains, and partly from the refuse of various manufactories on their banks. It is remarkable that no cases of cholera occurred immediately contiguous to the banks of these streams, though I had expected that many cases would be found there; for, during the cholera epidemic of 1832, the first group of cases in the town occurred in Allen's-court, Long Millgate, situated on the left bank of the Irk, immediately opposite to where the sewer from the workhouse opens into it, and the stench from which is often very great.

"Before concluding these disjointed remarks I must again repeat that, so far as regards my district, the grand evil seems to be the accumulation of such vast numbers of privies and cesspools in the heart of the densely peopled town, rendering it one huge Augean stable, the cleansing of which seems a truly Herculean task."

The following is Mr. Noble's Report on the state of ST. GEORGE'S DISTRICT:—

"The great bulk of cholera cases that have arisen in my district have been in localities distinguished as the *habitat* of fever.

"The sanitary condition of these is, in many respects, very bad, and in some not so much so as in corresponding districts of other large towns.

"To particularize:—The supply of water is scanty and intermittent, being obtained from pipes; the flow, I am told, is for little more than an hour each day, and there are at least 20 families for each pipe. The quality is so bad that animalcules are frequently visible to the naked eye. The custom with those who can purchase a filter is nearly always to use one.

"The open streets very generally are sewered and drained; the surface drainage is also good, but in courts there is a great defect, water and refuse frequently accumulating, owing to the paving and flagging being out of order, and to the gully-grates being in bad repair. These latter are not trapped, and they frequently emit sensibly obnoxious effluvia. All but the worst-conditioned dwellings have drains leading to the sewers, but they are frequently out of repair.

"In the particular haunts of epidemic disease the privies correspond in their character with the worst accounts that recent sanitary reports have afforded.

"The sewers open into the river Irk, which is little more than a broad stream. The emanations are offensive enough at times, and the water is substantially an open drain. It borders the north of my district. Cholera did not prevail to any great extent on the bank, a circumstance probably attributable to the comparatively rural character of the locality.

‘ As a general rule cholera could not be connected with specific nuisances, manure heaps or pigsties not existing to any extent. I only know of one tolerably extensive slaughter-house in Lees-street, and contiguous thereunto many cholera cases occurred.

“ The lodging-houses are numerous and very crowded, and such places furnished the majority of cases.

“ In the epidemic tracts cellars abound. The houses in such neighbourhoods are very commonly back-to-back.”

DEANSGATE DISTRICT.—Mr. Stott, the medical officer of this district, gives the following account of its sanitary state:—

“ 1st. The water supply is usually obtained from pipes. In some few localities from wells. The former is supplied by the Waterworks Company, and is of good quality, the latter is generally reported as inferior. Where the pipes have been recently put down it is complained of. The supply in both instances is intermittent; from the waterworks every morning early, and from private pumps from 7 to 9 A.M.

“ The only parts of this district where the supply of pipe-water is wanting are concomitant with the parts first attacked by cholera, where it set in with the greatest violence, and, indeed, where every evil in a sanitary point of view is met with.

“ 2nd. The state of drainage is generally good, as it is, I believe, throughout the whole city. The affected districts are sewered, and the gully-grates are in good order, with few exceptions. The privies and cesspools are well and properly attended to, and, except in a few solitary instances, of proper proportions.

“ 3rd. The relation of the attacks of cholera to river banks, &c., may be well observed in this district, surrounding one part of which, the southern or Knott Mill extremity, where the disease first set in and spread, is a stream constantly impregnated with offensive effluvium from dye-works, &c., in the neighbourhood.

“ 4th. It appears that cholera was connected with specific nuisances in a few instances, viz., in Bridgewater-street (five cases in one cellar), near to which there is a scavenging depôt; in Alport Town, where there are manure-heaps, and where a number of pigs are kept; in Back Queen-street and in Wood-street and Spinning-field, where the slaughter-houses are numerous.

“ 5th. The state of the lodging houses has been much improved of late by the authorities; they are usually in a very clean state, and overcrowding is but seldom met with. The same remark will apply to private dwellings.

“ 6th. There are not many instances of back-to-back houses that are not tolerably ventilated. Many of the houses are old and large, and consequently each is occupied by several families.

“ 7th. The part to the west of Deansgate is generally open, well ventilated, and occupied by good houses and streets; there are some small portions, however, of this district highly objectionable in all these respects.

“ The eastern part is much more densely inhabited, and consequently less ventilated; and in this section of the district has cholera prevailed in the proportion, I should say, of three to one at the least.

“ Where back-to-back houses do occur the intermediate passage is generally foul, badly paved, and often not drained, consequently the

surface-water distils through the cellar walls, causing them to be damp, &c. I believe the most grievous complaint of the cellar inhabitants is want of privies, water, and ash-pits."

The slaughter-houses referred to in Mr. Stott's report were a cause of great nuisance and complaint while the cholera prevailed in the town, and gave rise to considerable alarm in the neighbourhood where they are situated. A statement of the circumstances was made to me, both verbally and in writing, and a formal complaint, signed by the 29 chief householders living within 150 yards of the nuisance, was laid before me. It is stated that all the small tenants would also have signed it had they been called on. This latter document was accompanied by a description of the nuisances by Dr. Stephens, F.R.C.S., and, as it gives a good account of the class of annoyances usually experienced from slaughter-houses, and of the effects they have on the public health, I give the following extracts from it:—

"There are five or six butchers who slaughter in the houses in Rowe's-court in Bridge-street; one or two of them slaughter very extensively for butchers in general, that is, for those who do not kill for themselves. At a low calculation it is considered that about 200 head of cattle per week are killed in this confined spot. Places more unsuitable for slaughter-houses could not have been selected. These back courts cannot be approached except through narrow winding passages, hence there is great difficulty in driving the cattle through them, which leads to disgraceful cruelty in forcing by beating and almost worrying them with dogs. In the confusion the poor affrighted creatures run in wherever a door remains loose. The shouting and cursing of the drivers, the noise of heavy blows on the animals, and the barking of dogs are very vexatious and painful. We have no respite even in the night time. Slaughtering generally commences at four o'clock in the morning, and the neighbours hear every beast knocked down, occasionally accompanied with dreadful groans.

"The worst circumstance about these slaughter-houses is the accumulation of an enormous quantity of animal and vegetable matter in large holes, where they lie festering, fermenting, and putrefying together, and from which there is a constant emanation of offensive vapour poisoning the atmosphere, and highly dangerous to those houses which form the enclosure of these places. The climax of all that is abominable takes place when they are emptying these holes. The operation commences about one o'clock in the morning; the stuff is wheeled into Bridge-street, where it is thrown down, to be conveyed away by carts before 8 A.M. During the whole of this time the horrible stench is so great that it produces in every person who is subjected to it a sickening sensation. I have seen persons heaving and vomiting. As to the houses, it is utterly impossible to keep the stench out by closed windows; every room is pervaded by it. I am myself obliged to put a handkerchief over my nose and mouth scented with spirits of camphor or creosote. Most of the neighbours awake with headache, nausea, and loss of appetite. It is one of the most disgusting sights to see the loading of the carts; scores of yards of green, blue, or yellow putrid entrails hang in festoons over the sides and wheels. I have also seen large masses of coagulated blood, and sometimes the whole stuff of a brownish red colour from this addition.

“ The fluid contents of the holes are drained away into sewers, which, I understand, are very imperfect. At the time of emptying the holes the poisonous vapours waft up the main sewers into the domestic sewers, especially the kitchens and cellars, and from this cause I have been obliged to remove the slop-stone from my kitchen, and close up the sink entirely. The accumulation of animal substances attracts large numbers of rats, and the houses are infested with prodigious quantities of common flies and flesh-flies.

“ I can state, from extensive experience in practice in this locality, as well as in other parts of the town, that the nuisance is decidedly injurious, and even dangerous, to the health of the inhabitants, and predisposes them to more disease than in other localities where no such nuisances exist. I think that some diseases are excited or produced by it, such as fevers, dyspepsia, &c. The prevailing diseases at all times are low gastric fevers, with a strong tendency to run into the typhoid state. Several patients have declared to me their conviction that the nuisance was the exciting cause of their illness. The majority of these cases recover, but their progress is tedious and lingering. I have seen some cases in Bridge-street, and in the small houses behind the slaughter-houses, of decided malignant typhus. During the epidemic there has been a great number of attacks of diarrhœa and cholera in the neighbouring streets. On reference to the registrar I find there have been eight deaths from cholera alone in these localities.”

The next Report is from Mr. McKeand, Medical Officer of the LONDON-ROAD DISTRICT.

“ The London-road district, being the name given to that portion of the town under my direction, contains a population of about 30,000. It is bounded upon one side throughout its whole course (say the distance of a mile and a half) by the river Medlock, a black filthy ditch, into which the inhabitants upon its borders or the various manufactories in its course, consisting of dye and chemical works, pour all their superabundant filth. Innumerable privies, connected with the back of long terrace ranges of private dwellings, empty themselves into the same source; in fact, it is the eliminating channel for all who can reach its banks to pour off every nuisance, liquid or solid. The opposing side of the district is bounded by the Rochdale Canal, nearly throughout the same extent.

“ The Ashton and Stockport Canal runs for the most part through its centre, so that you will perceive we are well supplied with water of a stagnant character. I may mention that the Medlock is never emptied of its filth, except in times of floods, or very partially so; the stream in many places, in dry weather, is not more than 2 feet in depth at its centre.

“ The district is supplied in general by stone pipe water, which is only allowed to run on during certain hours of the day; it is very good on the whole, but all who *can afford*, filter it. I am supplied through the same source at my own dwelling, of course, always filtered for table use. There are also many pumps spread through the district, which yield good water; it is not so much the quality of which I complain, but the quantity; the poor have often long distances to carry it, and there is *never* sufficient for clearing the drainage accumulations.

“ Cholera principally localized itself in the centre of my district; a large square knot of old buildings, which is bounded by the Medlock

upon one side, and by Granby-row on the other, with its burial-ground, overflowing to repletion, and constantly exhaling the most foetid smells. It ought long since to have been closed. I may remark, it is one of the Catholic chapels where the Irish are principally interred, and has long been a bane to the neighbourhood; the other two sides are bounded on the one hand by the large public thoroughfare, the London-road, and the other by Shepley-street. I cannot state with correctness, but, at a fair guess, would say 2000 human beings reside in the dwellings of the above square. The houses are all old, principally having cellars to them, full of courts without yards, and all built back to back, without any passage, and ventilation of course deficient; the neighbourhood has its due share of manure heaps, piggeries, bone-dealers, cinder accumulations, &c. &c. The drainage is very bad, as it always is about the old dwellings; the privies are crowded with too many applicants, one sufficing in general a bundle of houses; the poor in these places, I find, make much use of chamber-pots, in preference, and empty them on the cinder heaps. The town of late has done much to remedy this evil, and in one part has built several privies, as additional accommodation, but they have been placed before the dwellings in any little square which has been previously left open, and although, on the one hand, relieving one nuisance, add another of nearly a worse kind; the paving and street cleansing of the whole district is good. I may fairly state, cholera commenced, and remained to the last, in the above neighbourhood; that the cases, both of cholera and choleraic diarrhœa were in cellars, badly drained and ill ventilated houses, and especially those of an over crowded nature. Most of the cases were of a fatal character. In other parts of the district where cholera has occurred, it has principally been traceable to a not sufficient attention to cleanliness, although I have seen the disease occasionally when it could not be attributed to such cause.

"I have no doubt, if the district officers were duly empowered, they would be the means of saving many lives through their system of prevention, and until the business for nuisance removal of all kinds is laid on their shoulders, there will be no effectual check to that rapid and continuous accumulation of offending sources, always taking place in the large communities of towns like this."

ANCOATS DISTRICT.—The following is *Mr. McKie's* Report.

"The Ancoats district is intersected by two canals, the Ashton and Rochdale, and a small stream called Shooter's Brook. The supply of water is intermittent, and obtained from pipes and pumps, principally from the former, and is very inadequate, there being, in most cases, one tap for a great many houses, and only available *one hour* out of the twenty-four. Previous to use, it ought to be filtered, but few of the poor have the means. The district is generally well paved and drained. Very few houses exist on the bank of the river Medlock, and I am not aware of a single case of cholera having occurred there; the water of the river as well as of Shooter's Brook is impure, owing to manufactories, but not offensive. I believe, in the London-road district it is both.

"Cholera cases have in general occurred in groups, and the sanitary conditions which appeared to be most connected with the affected localities were the following:—overcrowding, want of ventilation, back-

to-back houses, cellars, drains into sewers, not trapped; and to these may be added, in some of the groups, want of paving, sewerage, and draining."

These reports on the sanitary condition of the districts of Manchester township, where cholera became localized, appear to me to be particularly valuable, and to form a good basis on which to rear such a system of structural improvement as is required for so great a population. I feel satisfied from experience in other places, that the epidemic has in this instance also acted as a true indicator of those defects which lower the physical and moral standard of the people; and it is to be hoped that the warning voice which is still audible will not be allowed to pass unheeded. That the deaths were not more numerous I feel persuaded is, in some measure, owing to the great extent to which lime-washing and house cleansing were carried by the local authorities; but it is evident from the general tenor of the reports, that many other things require to be done before the public health can be considered safe.

I began the inquiries necessary before the introduction of the preventive measures on the 24th of September, and inspected most of the localities then suffering from the disease. The arrangements were found not to be adequate for the emergency, and a new organization had to be put in force.

The five districts of the township were retained, and the medical officer of each was appointed to act as superintendent for his district, and to take the entire charge and responsibility of the arrangements.

To each of the districts a sufficient number of qualified medical officers were appointed, for the treatment of all promontory cases and cases of cholera applying to them within the limits of their district. They attended to all cholera cases discovered in their district by the medical visitors, and also all cases that had been attended through the night by the medical officers stationed at the night dispensaries.

A daily report of cholera cases in each district, with the residences of each case, and a report of the number of premonitory cases attended by the medical officers, with the streets and lanes affected, was made up each day, for the use of the medical superintendents. The premonitory cases were classed under two heads, to wit, "Simple Diarrhœa," and "Cases approaching to Cholera."

In conformity with the regulations of the General Board of Health, the medical officer was instructed, whenever a case of cholera occurred under such circumstances as to render it probable that the disease might spread from overcrowding, or other similar causes, to remove such of the inmates of the affected house, to the House of Refuge, as he might consider necessary for safety.

It was a special instruction, that removal of patients to hospital when necessary, should be determined on as early in the disease as possible, and that no case approaching to collapse should on any account be removed.

The medical officers reported daily to the medical superintendent of their district all houses where lime-washing or cleansing was required, and all nuisances which ought to be abated.

The medical visitors were allocated in those districts of the town

where the cholera had shown itself. They were instructed to visit each house in the districts once a day at least, and in cases of sudden attacks in confined localities at such shorter intervals as might be necessary. They were to inform the people specially as to the object of their visits on going round the first time; and, if possible, to see every person in the house, and converse with them, in order that all might know the object of the visitation, so as to render every information and assistance to the visitors on their subsequent visits. The visitors were requested to impress on the people the necessity of attending to the earliest symptoms of derangement of the bowels, and to direct them specially to apply to the nearest dispensary, or to the district medical officers, if taken ill during the intervals between their visits. They also carried with them suitable medicines to administer to all persons suffering from cholera, or from premonitory symptoms, and exhibited them on the spot where required; and they gave information or caution to the people in regard to cleanliness of persons or houses; the danger of over-crowding; the necessity for ventilation; the evil of drinking habits; and other similar matters.

All cases of cholera, discovered during the visitation, were treated by the visitors, until they could be transferred to the medical officers of the district where they were found.

Cases of diarrhœa or rice-water purging were attended by the visitors till the parties recovered; but if any case passed into cholera while under treatment, it was transferred to the medical officers of the district.

The visitors reported to their medical superintendent all instances in which lime-washing or cleansing, either external or internal, was required, and all nuisances which needed removal. They also made daily returns to the superintendents of all cases of diarrhœa, cases approaching to cholera, and cholera cases discovered on the visitation; and met with the superintendents every day, to give in their reports, and to consult on the concerns in their districts.

Suitable medicines for the treatment of simple diarrhœa were provided at each of the five day dispensaries, and a dose or two dispensed to each applicant labouring under disease; but the case was sent to the medical officer of the district for future treatment. All persons applying for medical aid for patients confined at home, were also carefully referred to the medical officers of the district.

Five night dispensaries were open from 10 o'clock, P.M., till half-past 7 o'clock, A.M., of the following morning. All applications for medical aid for persons seized with illness at home were immediately attended to by the medical officer on duty. Cases of cholera, or premonitory cases, which had been visited during the night, were transferred to the district medical officers not earlier than half-past 7 o'clock of the following morning. One medical officer from the staff of each district took the night duty at the district night dispensary by rotation.

The superintendents met with the visitors once a day, and received their reports. They classified and made up the returns, and sent a copy each day to the General Board of Health. They received all reports from the visitors and district surgeons, as to lime-washing and cleansing required, and forwarded them daily to the proper authorities.

The superintendents were instructed to ascertain the precise localities

most affected by cholera, by means of the returns received from the district medical officers and visitors, and from the registrar's books, and from any other sources of information, and to make out lists of affected localities on which to locate their visitors for their daily work.

They took a general charge of the sanitary and preventive measures in the district, and as the responsibility of the proper medical relief of the sick rested with them, they had to make frequent visits to the affected portions of their districts, and to report to the Guardians whenever additional medical aid, or a larger number of medical visitors were required. They used their influence, when necessary, in aiding the removal of families to the House of Refuge, or patients to the hospital. And the superintendent in whose district the House of Refuge was situated, was instructed to inspect the inmates twice a-day, in order that all premonitory cases occurring among them might be brought immediately under treatment. They also visited the hospital to examine into its efficiency.

Daily minutes of the proceedings of the meetings were made, and laid before the Sanitary Committee of the Board of Guardians, along with daily schedules showing the state of the disease in the Union.

A suitable schedule was provided for each officer and institution, so that the working of the entire preventive machinery could be at any time ascertained with great ease.

The following is a summary of the organization adopted :—

Five districts, with a medical superintendent to each.

Thirteen Medical officers to attend cholera cases.

Nine Medical visitors for house-to-house visitation.

Five day dispensaries, with suitable attendance.

Five night dispensaries, with a qualified medical attendant to each.

One house of refuge.

One cholera hospital, with proper medical attendance.

A suitable staff of nurses.

A hand-bill warning the people, and describing the arrangements made for their protection, was printed for each district, and was distributed by the police to every house in the affected localities. A code of instructions was also printed for the medical officers and visitors.

It took several days to bring the machinery into full operation ; and the first return was made on the 2nd October. The visitors had only been a few hours in the districts, and yet they reported the discovery of 178 premonitory cases, 20 of which were in the act of passing into developed cholera.

From this period the preventive measures were carried out with great zeal and ability, by the superintendents, medical officers, and visitors, and let us mark the result. Table VI. gives the approximate number of cholera cases occurring in the parochial districts, from 1st September until the introduction of the preventive measures on the 2nd October ; and from that date it shows the entire number of cases of all denominations brought under treatment by the dispensaries, medical officers, and visitors. It is impossible not to be struck with the enormous amount of neglected premonitory cases, many of them of an extremely dangerous character, which were discovered during the house-

to-house visitation, and with the very small proportion of them which finally passed into cholera. The preventive measures were in operation for about a month, and the aggregate of cases treated within that period was as follows:—

Applicants at Dispensaries.	Diarrhoea Cases Discovered by Visitors.	Cases approaching to Cholera Discovered by Visitors.	Premonitory Cases passed into Cholera.	Cholera Cases.	Deaths.	Recoveries.
936	2,612	261	27	169	75	84

It will thus be seen that out of 3,609 premonitory cases, no fewer than 261 of which were caught in their passage into developed cholera, only 27 actually did so, while above half of this number occurred within the three first days from the commencement of the preventive measures, and before they were in full operation. The effect of these successful means was, that a check was immediately put to the development of cholera. Plate 11 (see Report, page 100) shows this result in a striking manner for the whole township, but not so much so as the districts do when taken individually.

I have elsewhere stated that cholera attacks *successive groups of localities*, so that while it is being kept down in one, a fresh outburst in another vitiates the statistics. It is impossible to get rid of this element of error, by any other means than by circumscribing the *area* of the statistics as far as possible. Table VII. gives the number of premonitory cases and cases of cholera for each of the five districts in the township, and I have transferred the data to Plates 12 and 13 (see Report, page 100), which exhibit the results at a glance. It will be perceived that within a few days after the measures were in full operation, the cases were transferred from the denomination of *cholera* to that of *premonitory*, and the developed form almost immediately disappears, while the earlier stages continue till the epidemic influence declines. It appears to me that these diagrams exhibit as strong proofs of the success of the preventive measures adopted in Manchester, as the nature of the case admits of.

The following extracts from Mr. Noble's report, already mentioned, will show the opinion entertained on this subject by the gentlemen who had the actual working of the methods adopted for arresting the epidemic:—

"You will perceive, from the whole of the foregoing figures, that prior to your operations in this locality, no indications of decline were observable in the epidemic. Your arrival in Manchester took place on Monday the 24th September; and in four days (on Friday the 28th) the preventive organization was partially in action. By Monday, October 1st, all the medical officers and visitors were at work; not, however, till Wednesday the 3rd was the machinery in complete operation,—at which period superintendents, medical officers, visitors, and dispensaries, each fulfilled their respective parts as prescribed by the instructions issued under your sanction; and from this latter date the returns daily were punctually made. The following abstract from the general returns of each day, displays, in a very interesting point of view, the impression that your measures made upon the epidemic. Each

column exhibits the daily results as regards the discovery of new cases, and the issue of instances returned as cholera.”*

“The significance of the preceding table you will readily appreciate,—cholera cases diminished at once and rapidly. If, as was thought by some persons, the result was attributable to diminished temperature, or to the natural decline of the epidemic, there should have been a simultaneous and proportionate diminution in the amount of diarrhœa; this, however, you will see was not so;—incipient cholera, or diarrhœa, raged for nearly three weeks after the measures were in operation, but confirmed cases had become of rare occurrence.

“On the general working of the preventive agency, I cannot better reply to your several inquiries than by supplying you with a copy of the following note to myself from Mr. Lythgoe, a most intelligent surgeon, residing in the district of which I was superintendent. This gentleman was one of our most active and energetic medical officers, and his recorded experience corresponds substantially with the conclusions at which I have myself arrived, alike from my own observations and from conference with individuals of the medical staff generally.

“First—I believe the general working of the preventive measures to have been admirable, and the sole cause to which the rapid decline of the epidemic can be ascribed. I think overdue weight has been given to atmospheric influence in checking the disease, as I have observed, on several occasions, that, after 24 hours of a dry, bracing air, cases of relaxation of the bowels have increased both in numbers and intensity; this circumstance, as far as my own observation goes, has not been the result of accident; but has occurred on several occasions after atmospheric changes from a warm, moist, relaxing atmosphere to one of the opposite extreme. I have no hesitation, therefore, in awarding to the preventive measures adopted the full credit of having produced the sudden check and the succeeding decline in the epidemic.

“Second—The effect of house-to-house visitation is best shown by the almost total cessation of the calls upon the district medical officers for the locality in which the house-to-house visitor is occupied; he appearing to banish the disease as he progresses. House-to-house visitation in this district has been most salutary and efficient in checking the premonitory symptoms which, at the commencement of the outbreak, the lower orders of Irish were disposed to neglect.

“In answer to the third question, I can safely say that, as medical officer, I have had the most unbounded confidence and reliance shown me by the patients and their friends, which may have tended in some degree to their security. My suggestions as to prophylactic measures in general, and the treatment of cholera, whenever practicable, have always been strictly and energetically carried out; in short, even among the most indigent, I have met with a ready acquiescence and obedience to any suggestions offered. I have much pleasure in stating, that, with very few exceptions, the most grateful feeling has been evinced by the necessitous poor for the services rendered; and I have no doubt the measures adopted by Dr. Sutherland for their relief are considered by them as the greatest boon which could have been offered.

“THOS. LYTHGOE,

“District Medical Officer, St. George’s.

“D. Noble, Esq., Medical Superintendent.”

A meteorological table, subsequently published by Mr. Noble, showed that the state of the weather had no connexion with the change in the character of the epidemic. The statistics and diagrams, indeed, prove that the epidemic declined *as a unity* during the whole month of October, but they at the same time prove, that the preventive measures kept it from assuming the true developed character, com-

* These data are given at length in Table VI.

monly known as cholera, for three weeks of the period. Epidemic cases still occurred, but made their appearance almost solely in the *premonitory* part of the schedule. I subjoin the individual opinions of other medical superintendents.

DEANS GATE DISTRICT.—*Mr. Stott*, Medical Superintendent, says,—“I beg leave to assure you of my entire approval of the preventive measures which have been originated by the General Board of Health, and which have been recently so successfully carried out in this city. The effect of the house-to-house visitation in cholera appears to me to be the only decided means of staying the progress of the disease and of saving life. The result of this mode of action has been well shown in the New Bailey Prison here, where we had 73 cases ‘approaching to cholera,’ of which 23 became decided cases. Out of these only five deaths occurred, and this satisfactory result may be entirely attributed, as I believe, to the daily searching inspections instituted.

“I am perfectly satisfied that the house-to-house visitation has been very efficiently carried out in this district, and I am informed that the visitors, generally speaking, were most cordially received and welcomed by the inhabitants—that a degree of confidence, as well as a feeling of safety was thereby engendered, and that much good in the removal of nuisances has been accomplished. Cholera, I am happy to say, has almost entirely passed away from us, and though in the early period of its course it was violent and destructive in the extreme, yet, thanks to the more recent measures, and as compared with other districts, I think we have much reason to rejoice that we have been so leniently dealt with.”

LONDON ROAD DISTRICT.—*Mr. McKeand*, Medical Superintendent, writes,—“I have much pleasure, as one of the district medical officers of the Manchester Union, in tendering my humble testimony to the admirable manner in which the system of checking the cholera epidemic has so truly and faithfully answered.

“I consider, in the first place, that the manner of pursuing the cholera, as suggested by house-to-house visitation, has assisted most effectually in arresting its progress. To those well acquainted with the habits of the lower orders in large cities, we discover with sorrow to what extent disease often commits its ravages without any medical aid being applied for, and in cholera more particularly, where the fatal effects so soon follow its seizure. I view the system of house-to-house visitation as indispensable; without it many, many lives must have been sacrificed. Its effect has been to give confidence to the poor and timid, and waive off many fears, the existence of which we know to have much baneful influence. From the very day of the system being established, as will be seen by the returns, the disease gradually gave way, each day bringing in succession a most extraordinary and rapid decrease.”

MARKET-STREET DISTRICT.—*Mr. Golland*, Medical Superintendent, writes as follows:—“In answer to your inquiries respecting the medical arrangements for the treatment of cholera, I should say, that at the time of your first visit to Manchester there was great alarm amongst the people, and a general feeling of irritation and distrust in the minds of the poorer classes at the delay and difficulty experienced in pro-

curing medical aid, which rendered them often apathetic and careless in applying for assistance. As soon as it became known, that in accordance with your arrangements, prompt and efficient assistance could at all times be immediately secured, the alarm almost entirely subsided. The beneficial effect of the preventive measures adopted became very soon evident in the decrease of deaths and the rapid decline of the epidemic. The house-to-house visitation which you organized seemed in the highest degree beneficial, first by inspiring confidence, and secondly by the immediate and effectual treatment which it afforded to all premonitory cases. It had another beneficial effect in discovering and removing, as far as practicable, of many nuisances and causes of disease which would have been otherwise overlooked. From my observation of its working here, I have come to regard house-to-house visitation as the most important of the preventive measures in epidemic cholera. As far as I could judge it was very well carried out here. I do not think that the beneficial effects of wise and judicious medical inspection could be better illustrated anywhere than in the case of the Manchester epidemic."

IV.—REPORT ON THE MEASURES ADOPTED FOR THE RELIEF OF CHOLERA IN THE BOROUGH OF KINGSTON-UPON-HULL.

THE Borough of Kingston-upon-Hull is under the jurisdiction of two Boards of Guardians, one representing the united parishes of the Holy Trinity and St. Mary's, and the other being the Board of Sculcoates Union. I have elsewhere given a minute account of the circumstances attending the first imported cases of cholera into the town from Hamburg. This event took place towards the latter end of September, 1848, and although there appeared to be no immediate danger of an outbreak of the disease at that time, I deemed it my duty to call the attention of the guardians to the necessity of making arrangements for the protection of the public health. With the exception of one or two sporadic cases of cholera, the disease showed no tendency to locate itself until the month of July, 1849, at which period I was directed by the General Board of Health to make an inspection of the borough for the purpose of ascertaining the nature of the attack, the preventive measures which had been adopted, and the amount of medical relief afforded.

There could be no doubt that the disease had then become localized in the district called the Mytons; but I am sorry to say that, with the exception of a laborious and tedious process for abating a few nuisances, no steps of a really preventive nature had been taken. No houses had been lime-washed, no houses of refuge provided, the dispensary relief was utterly insufficient, and no house-to-house visitation had been adopted. These remarks apply especially to the defective arrangements in the united parishes of Holy Trinity and St. Mary's, for the cholera had not as yet become prevalent in the Sculcoates Union. In the urban districts of the latter, however, the sanitary preparations were most inefficient. Immense accumulations of manure existed in the midst of densely peopled neighbourhoods, and the cleansing in many of

the localities most likely to be visited by the disease had been grievously neglected.

I drew the attention of the authorities to the measures which required to be adopted, and a distinct plan of procedure was verbally agreed to by the Guardians of the Hull parishes in order to meet the probable advance of the disease; and after having received assurances of its being carried out, I left the town.

From this time the epidemic progressed, at first slowly, but afterwards with enormous speed; the mortality from cholera, and cases reported as diarrhoea, rising as high as from 80 to about 100 a day. On account of the very urgent representations made by residents in the town, setting forth the utter neglect with which the regulations of the General Board of Health had been treated, I was again directed to visit Hull, which I accordingly did on the 13th September, and found the aspect of things even worse than had been represented. The authorities of Sculcoates Union must, however, be excepted from these remarks; for although their preventive measures were incomplete, they were in a state of considerable forwardness, and as soon as the necessary steps were pointed out they were immediately taken.

It was stated to me that the acting committees of the Boards of Guardians had met with great difficulties in the removal of the most dangerous nuisances, from indisposition on the part of the magistrates to convict the offenders.

The Guardians of the united parishes of Holy Trinity and St. Mary's I found had taken no one step to carry out the arrangements to which they had agreed two months before. They had still no house of refuge; they had closed all the dispensaries; their medical attendance was insufficient; they had employed no house-to-house visitors; they had limewashed no houses; they had organized no cleansing staff; and, what was worse than all, they appeared to have arrived at the conclusion that cholera was a divine judgment utterly beyond human aid, and against which no means of saving life could be of any avail.

All the circumstances were immediately reported to the General Board of Health, as well as the imminent danger to which the public safety had been exposed by the conduct of the Hull Guardians. The Board in consequence issued special regulations, in compliance with which the town was divided into a convenient number of districts, and the following arrangements were adopted:—

	Holy Trinity and St. Mary's.	Sculcoates.
Districts	3	9
Medical superintendents . .	1	1
Medical officers	6	9
Medical visitors	6	9
Day dispensaries	4	6
Night dispensaries.	1	2
Houses of refuge	1	1
Hospitals	1	2

The Hull Guardians were directed also to provide an Inspector of Nuisances, and a cleansing staff of 12 men for the limewashing of the houses in affected localities. The additional medical aid required to carry out the regulations had to be obtained from Edinburgh, and a day or two passed over before the whole arrangements were completed. A partial visitation was however begun in Hull on the 17th, and in Sculcoates on the 20th of September, and in a few days the whole machinery was in full operation. The working of the various parts of the preventive machinery was laid down in a code of printed instructions, schedules were provided, and printed notices distributed through the town to inform the people.

Up to this period the disease had confined its ravages chiefly to the parishes of Hull, and as there was no sufficient medical aid appointed by the Guardians, no idea of the number of cases occurring in the town could be obtained. I fear that not a few died without medical advice of any kind, and that these "casualties" would have been more numerous had they not been prevented by the sympathy and devotedness of many members of the medical profession who attended the poor without reward. In estimating the amount of good done by the measures of prevention in this instance, we must be guided chiefly by the returns of the Registrars, as there were no antecedent statistics with which the subsequent course of the disease could be compared. Table V. gives the data for the whole borough from the 31st August to the 22nd October, 1849.

The total numbers attended in all stages of the epidemic by the parochial officers, under the special regulations, were as follow:—

Dispensary Cases.	Diarrhœa discovered by Visitors.	Cases approaching to Cholera discovered by Visitors.	Premonitory Cases passed into Cholera.	Cholera.	Deaths.	Recoveries.
878	4,665	351	17	344	135	186

NOTE.—The results of 23 cases of cholera are not given in the returns.

It will be seen that, out of 5894 premonitory cases, 351 of which were passing into cholera, all were arrested except 17. The Tables show the enormous preponderance which the premonitory cases hold over those of cholera wherever a complete system of visitation is enforced, while at the same time they prove how small a proportion of cases apply of their own accord for dispensary relief.

The great majority of the latter class of cases occurred in the Hull parishes; while in the Sculcoates Union only 193 persons applied at the six day dispensaries for relief during the whole period the preventive measures were in force. A comparison of the registrar's returns of deaths from diarrhœa and cholera with those of the parochial medical officers, prove that a great number of persons died from the disease who were not necessitous, and who consequently did not come under the operations of the parochial relief measures; and we have thus another proof that, while the very poorest were protected by the arrangements,

the better class of working people in the receipt of wages, and not coming under the denomination of *necessitous persons*, suffered.

The Registrar's returns give the following weekly deaths from diarrhoea and cholera, which may be contrasted with the number of premonitory cases brought under treatment within the same periods:—

—		Deaths.	Premonitory Cases.
Week ending September	6 .	398	..
„	13 .	507	..
„	20 .	324	383
„	27 .	171	1,950
„	October 4 .	111	1,611
„	11 .	28	1,222
„	18 .	10	514

The house-to-house visitation was in operation in the Hull parishes on the 17th September, and in both Hull and Sculcoates on the 20th; and from these dates the returns show a prodigious number of diarrhoea and incipient cholera cases brought immediately under treatment, and which before had been left to take their own course without any attention, while at the same time the reduction in the number of deaths registered is most remarkable. It is impossible to say how much of this result is specially due to the preventive measures; but I am of opinion that, in this instance, as in many others, the decline of the epidemic influence is to be looked for, not in the diminished number of deaths registered, so much as in the decline of the premonitory cases, and that the arrest of these in their course towards cholera was the main cause of the statistical results which took place.

The preventive measures in the Hull parishes were placed under the superintendence of Dr. Ayre, and those of Sculcoates under Dr. Henry Cooper. Both of these gentlemen have published reports on the preventive measures presented to the Boards of Guardians, the following extracts from which I beg to subjoin:—

Dr. Ayre says—"In proceeding to give this report, I need scarcely remind you that six district surgeons attended to the patients through the day, whilst six others were occupied in house-to-house visitings, and three more were stationed throughout the night at the public dispensary to visit all who might need their assistance. The disease prevailed during three months, being less in duration by two months than it was in 1832; but what it wanted in the length of its continuance it unhappily made up in its almost unsurpassable malignancy, and especially in the early, and still more in the middle period of its prevalence. In the following Table will be seen the number of patients, and the results of the treatment employed for them; and it is with no inconsiderable degree of just pride, and with yet greater thankfulness, that I bring them under your notice. Of the cases here given it is to be understood that those of cholera were in full collapse when they came under treatment, and those in the premonitory stage were entering into that state; whilst of the diarrhoea cases the patients were

in that threatening condition which almost constantly precedes and leads into the full disease :—

Cases of diarrhœa attended by the six house visitors .	1,430
" " by the six district surgeons	608
" " at the dispensaries . . .	868
" cholera in full collapse.	725*
" impending collapse.	133
	<hr/>
	3,764
Deaths from diarrhœa	6
" collapse	365
	<hr/>
	371
Recoveries.	<hr/>
	3,393"

George-street, Hull,
October 26, 1849.

In a communication received from Dr. Ayre, dated October 7, proposing a reduction of the medical staff, he says—

"The whole system has worked admirably, and has been of the greatest service in abating the mortality by the early attention that was given to the diarrhœa cases, none of which having scarcely ever gone forward into the true disease."

Dr. Cooper, addressing the Sculcoates Guardians, reports as follows :—

"It will be remembered that when the system of visitation was established three weeks ago, that portion of the borough which is within the Sculcoates Union was divided into nine districts, each of which was under the care of a district surgeon, and that a staff of visiting officers was appointed to visit in each district from house to house, especially where their services were most required. Six dispensaries were opened in the various parts of the Union, at which medicines were dispensed gratuitously at the order of the surgeons and visitors; and at two of these medical attendance was given at night for the relief of urgent calls. Two hospitals were provided for the reception of destitute persons attacked with the disease; and a house of refuge was opened as a shelter for the families of the sick, whom the medical attendant considered not to be safe at their own homes, or whose houses required emptying and thorough cleansing. This system came into full operation on the 20th of last month, and I purpose now to report briefly to the Sanitary Committee of the Sculcoates Board how far it has been carried into effect according to the instructions, and what have been the results of our operations; and especially to call attention to the present state of the public health, and the extent to which it may be thought necessary to persevere in or relax these preventive measures. In forming an estimate on these points it must be borne in mind that the object of the visitation system is *prevention* rather than *cure*; it aims at searching out and detecting disease in its early and only manageable stages; because it is found that the poorer classes are too ignorant, too careless, or too apathetic to apply for a

* It may be proper to state, that the greater proportion of the cases of cholera mentioned in Dr. Ayre's list occurred before the introduction of the preventive measures, only 214 having been reported after that period.

remedy spontaneously, until driven to it by symptoms which show the case to be beyond human control. Another intention of the system is to discover the location of the disease at any particular time, and to determine the point where it is most rife, and by concentrating our preventive force upon such points to check the evil in the bud. It further tends to give confidence, hope, and courage to the public mind at a time when these qualities are most likely to fail, and when their failure is attended with the most disastrous consequences. A further important result of the visitation system faithfully carried out is the discovery and exposure of nuisances in and about the houses and premises of the poor, which would otherwise escape detection; of these we have had 66 reported, all of which have received the notice of our inspector. Many destitute persons have also received relief by the same agency. Lastly, this system is intended to provide certainly and promptly the best known means of succouring those unfortunates who have already become the subjects of the malady in its confirmed and dangerous form. A reference to the Tables in the Appendix will indicate how far these results have been attained during the three weeks that the system has been at work. It appears by them that about 2,600 cases of disease in various grades have been discovered by the surgeons and house-to-house visitors; of these 2,234 have been cases of simple diarrhœa, the great majority of whom would undoubtedly have never applied for relief at all, and many others only when confirmed cholera had set in; 218 are cases exhibiting symptoms approaching to cholera; and 130 were discovered in a confirmed state of the disease. It is very gratifying to remark, that of those discovered in the earlier stages only 10 passed into cholera while under treatment; a number which shows on the one hand the tendency of these forms of disease, when uncontrolled, to pass into cholera, and on the other, how efficacious have been the means employed in averting this deplorable result. We further remark, that of 218 cases of rice-water purging,—a very advanced form of the disease, on the verge, in fact, of cholera,—only five passed into cholera, 213 having been saved by being timely discovered and treated. The gross number of recoveries has been 1,615. It is true that the disease, following the well-known law of epidemics, had reached its climax, and was on the decline before this system was introduced. Yet we had melancholy evidence that its virulence was far from being exhausted in the sad cases which occurred in our own staff, as well as many others about the same time in the higher walks of life; while the mortality among the humbler classes, who were the objects of this visitation, maintained a singularly equable and rapid decline.

“The unanimous testimony of the visitors is in favour of the high value which the poor set upon house-to-house visitation as a mark of attention to their welfare; and of their readiness to give information and assistance, and their thankfulness for the relief afforded.”

Saville-street, October 15, 1849.

Dr. Cooper gives the following Table of general results of the visitation to October 11.

Diarrhœa	2,174
Approaching cholera .	208
Cholera	129
	————— 2,511

<i>Deaths.</i>		
Cholera	49	
Diarrhœa	17	
	—	66
<i>Recoveries.</i>		
Diarrhœa	1,421	
Approaching cholera..	88	
Cholera	77	
	—	1,586
<i>Passed into Cholera.</i>		
Diarrhœa	10	
Approaching cholera .	5	
	—	15
<i>Attended by Night Officers.</i>		
Diarrhœa	132	
Approaching cholera..	39	
Cholera	25	
	—	196

In reference to the preceding Table, Dr. Cooper makes the following remark, which confirms what has been uniformly observed elsewhere, that the early discovery and treatment of cholera cases diminishes the mortality in a striking degree. He says—

“ The total number of cholera cases discovered by the visitors in the confirmed stage of the disease, and treated by the surgeons, has been 129, of whom 49 have died. This is rather a favourable per centage compared with the mortality which the disease has uniformly, and under every form of treatment, exhibited.”

The experience of Hull, when contrasted with that of Sheffield, to be presently described, affords another evidence of the great saving of human life which might have been effected had the recommendations of the General Board of Health been adopted when they were first given; while it ought also to raise the question of resorting to other means for protecting the public during epidemics, than trusting implicitly to the management of Boards of Guardians. The value of human life is so great, that were there only the possibility of such another catastrophe as occurred under the mismanagement of the Guardians of the Hull parishes, it ought to lead us seriously to inquire whether more efficient agents should not be selected to cope with similar emergencies should such unhappily arise.

V.—REPORT ON THE MEASURES ADOPTED BY THE SHEFFIELD BOARD OF GUARDIANS FOR THE RELIEF OF CHOLERA WITHIN THE UNION.

SOON after Asiatic cholera appeared in this country, a few members of the Sheffield Board of Guardians, in conjunction with their clerk, Mr. Watkinson, began the work of preparation for the anticipated outbreak of the epidemic. They took the documents published by the General Board of Health as their guide, and proceeded with the determination of doing all that could be done, and at whatever cost, to save the town from the danger which impended over it.

Active measures were taken for continuous cleansing and for keeping the town free of nuisances, and suitable officers were appointed for the purpose, the object being to remove as far as practicable every

source of atmospheric impurity, so as to enable the population to resist the epidemic influence when it came upon them. The gentlemen on the Sanitary Committee availed themselves of every means of information, and when the advance of the disease became more threatening, they summoned the medical profession together, and consulted with them in regard to the proceedings which ought to be followed.

The results of this cordial co-operation were most beneficial. With a thorough knowledge of the habits of the people, and an enlightened appreciation of the importance of the great leading points in the preventive measures laid down by the General Board of Health, and guided also by the results of experience elsewhere; the Committee agreed to a certain definite plan of procedure of a medical preventive kind, to be put in operation as soon as the epidemic appeared.

It is hardly possible to overrate the importance of these preliminary steps. Unlike other Boards of Guardians, they had used the most available means for preparation, and they had nothing to seek when the emergency arrived. All their plans of operation were settled, and their machinery arranged. In this, the Sheffield Board of Guardians stands almost alone. They are, I believe, the only body in the country who had the enlightenment to perceive the full extent of their duty, and the courage and energy to perform it. This I believe was done without regard to expense, and in the firm conviction that apart altogether from the humanity of the course they had taken, the rate-payers would be large gainers in the ultimate saving of widowhood and orphanage which was, without doubt, effected.

In addition to the ordinary cleansing operations, the leading points which were kept in view in the plan of relief measures adopted, were: 1st. Directing the medical treatment almost entirely against the premonitory period of the disease. 2nd. The removal of the healthy from infected houses and neighbourhoods. 3rd. The use of quicklime wash to a large extent as a preventive measure. 4th. The home treatment of cholera cases.

It will be perceived that the Board of Guardians adopted those principles so often fruitlessly enforced on other similar bodies by the General Board of Health.

About the middle of July last, two imported cases of cholera occurred in Sheffield, but the disease attacked no one else in the town at that time. On the 26th of August, however, a sudden outbreak of diarrhœa took place, which in the space of three days spread over the whole town, but affected most severely those parts along the river banks, which are usually affected by typhus. One elevated district called the Park, which is chiefly inhabited by colliers, and in a bad sanitary condition, also suffered. As soon as this diarrhœa appeared, the circumstance was reported to the Sanitary Committee. The medical men who were to act were immediately called together. The dispensaries were opened. Notices were issued, and the whole machinery, previously prepared, was set in motion at once.

On the 4th of September, a week after the medical relief measures were in operation, the first cases of cholera occurred in Bald-street, opposite the dam head on the river Don, and from that period to the final disappearance of the epidemic, there were brought under treatment the following proportion of cases:—

Diarrhœa.	Cholera.	Deaths.	Recoveries.
5319	76	46	25*

An analysis of 2,196 of the cases classed as "Diarrhœa" in the preceding table gives the following result:—

Simple diarrhœa.	1,522 = 69·0 per cent.
Dysentery	424 = 19·4 „
Diarrhœa, with vomiting	130 = 6·0 „
Ditto ditto and Cramps.	39 = 1·8 „
Rice-water evacuations	81 = 3·8 „

We have an epidemic of this character, attacking nearly the whole surface of a town, and no person who looks at the nature of the cases can doubt that they would have exhibited a much greater proportion of cholera attacks, had the preparatory steps already alluded to, not been taken. The population was, in fact, enabled to resist the epidemic influence and the object of the sanitary measures was to a great extent fulfilled. The main localizing cause in Sheffield was bad water and the dampness of the river banks, but especially the former. The town generally has a good water supply, but in the localities affected, as well in Sheffield as in the neighbourhood, the water used was largely impregnated with animal matter from sewerage and from street and road washings. This was the real reason, in my opinion, of the great majority of the attacks. The removable causes were summarily and effectually dealt with, and hence districts escaped with diarrhœa in Sheffield which in other towns would probably have been the seats of cholera. Causes which there were no legal powers to remove were left in operation, and under these cholera localized itself. Perhaps no more instructive illustration of the connexion between epidemic attacks and local sanitary defects could be given.

The following are the details of the plan of medical relief which was adopted.

Sheffield was divided into seven districts with a day and night station to each. These stations were placed in the houses of mechanics and others in humble circumstances. A notice was drawn up telling the people where to apply for aid. It was posted on the walls, and a copy placed in every shop window and beer-house in the town. Copies were also placed in all the manufactories, but they were not distributed from house to house. Subsequently, however, it was found to be necessary to make house-to-house distribution of another notice, in order to warn the people more thoroughly.

At each of the seven stations, a quantity of astringent mixture was provided. Printed directions as to the amount of dose for each age were placed in the hands of the persons who distributed the medicine, for their guidance, and each applicant received a dose on the spot. His address was then entered in a printed form, and sent to the medical officer of the district, who visited the case at home. A printed form was provided for the prescription of the medical officer, and which was afterwards taken to the central dispensary at the workhouse, where the medicine was made up.

* The results of five cases are not given.

Twelve qualified medical men were employed for this district service. They followed up the treatment of the diarrhoea cases, and in going round they took care to warn the people of the need of early application. They prescribed for many cases that might be brought under their notice, and they inquired if any persons were sick in the neighbourhood, with the view of visiting them.

On inquiry at a station situated in one of the districts infected by cholera, I was informed that about one-third only of all the applications made, were those of individuals who came for medicine for themselves, and none of them were stated to be very ill, while the remaining two-thirds were applications for persons confined at home. In these cases it was customary to send a dose of medicine to be administered to the sick, while the case was reported to the district medical officer, as in the instance of personal applicants.

On arriving at the house of the patient, the district medical officer treated the case, unless it happened to be one of cholera, in which event he filled up a printed form, and transferred the case to one of the two hospital surgeons, who took charge of all cholera cases. At the same time, he filled up a printed form for a nurse. If any of the family were labouring under diarrhoea, he filled up another printed form, and had the patient sent to an hospital for such cases. The remaining inmates he reported on a printed form, as fit for admission to the House of Refuge. All these filled up forms were sent to the Clerk to the Guardians, who saw that they were attended to.

There was one special house-to-house visitor for infected districts. All cases of cholera, with their residences, were reported to this gentleman, who, on receipt of the report, took a general sanitary and medical inspection of the affected locality, and treated any cases he might find in it. He visited the locality several times a day.

The home treatment of cholera cases was strictly carried out, wherever practicable. There was a small cholera hospital for destitute persons, but very few were admitted into it. A large and well paid staff of nurses was constantly available, and as many as 25 have been in employment in the Union at one time.

There was one large and commodious building used as a refuge for the town of Sheffield. It was well situated, and every way adapted for the objects in view. The value of this important instrument in saving human life was fully appreciated. The persons admitted into it were carefully inspected, and all severe diarrhoea cases that occurred among the inmates were removed to the proper hospital. A good diet was provided for those that were well. The results of this important preventive measure were most satisfactory. There were 145 persons admitted from infected houses, about one half of whom became affected with diarrhoea, but owing to great vigilance in detecting the cases, only two deaths occurred. Mr. Micklethwait, who had the medical charge of the refuge, states that "all the inmates improved materially in appearance and bodily vigour, and expressed themselves grateful and cheerful for the kindness shown them."

Along with these preventive measures, great care was taken of the sanitary state of affected localities, and all unhealthy houses were lime-washed and shut up.

It will be perceived, that Sheffield exhibits the first and only

instance of a faithful and voluntary application of those principles of preventive medicine which the General Board of Health has been so long endeavouring to enforce. The authorities recognized the *unity* of the preventive measures, and the necessity of working them all together, in order to obtain the best practicable result. While in almost every instance in which the General Board of Health has been called on to interfere, measures have had to be taken hurriedly and on the spur of the moment, not only to prevent or limit the ravages of the epidemic, but to endeavour by every means to save human life from instant danger. The plan adopted in Sheffield, though somewhat too complicated, was still a successful one. It comprehended the elements of procedure combined together, which elsewhere it had been necessary to use in greater individual pre-eminence, to suit emergencies.

The small number of cholera cases, when contrasted with the large number of those of diarrhoea, is a sufficient proof of the success of the medical relief measures, and Mr. Watkinson states that "The medical officers recollect no cases of diarrhoea which passed into cholera after they commenced treating them." It will be perceived that this result was obtained through dispensaries with a modified form of medical inspection. It proves that the plan was suitable for the intensity of the epidemic attack; but I have given sufficient evidence elsewhere to show that in severe seizures a rigid medical visitation is indispensable. Even the cholera cases which did occur in Sheffield were not seen in the early stage, for Mr. Watkinson says that they "were either in a state of collapse, or bordering on it, when they were found." Had the visitation of houses been so active as to have ensured the early discovery of all these cases, either in the premonitory stage or before the period of collapse, the carrying out of the preventive measures would have approached as near to perfection as possible; but the occurrence of so many cases in the stage of collapse confirms the experience of other localities as to the danger of trusting to the poor to apply for medical aid of their own accord. As has been already stated, I attribute the comparative immunity which Sheffield enjoyed from developed cholera, and the appearance of the epidemic in its milder forms, mainly to the very efficient preparatory measures which were instituted and actively carried out for so considerable a time before the disease showed itself among the population.

Cholera appeared also in part of Sheffield, situated in another Union. The usual preventive measures of the General Board of Health were in this instance also successfully carried out by the authorities.

The details given in the preceding Reports appear to be sufficient to show the methods which have been usually adopted in giving effect to the regulations of the General Board of Health; and in order to avoid repetition, I shall add a few notes on various other towns, instead of reporting every minute particular.

LIVERPOOL.—The preventive measures were carried out in this large town under the superintendence of Dr. Duncan, officer of health to the borough, who states that the chief localizing causes of the epidemic were "The ordinary local and removable causes of disease; to wit, filth, want of drainage, offensive cesspools, &c., and particularly overcrowding," over the last of which, however, the authorities have no power.

“Local outbreaks of more than usual intensity were in almost every instance associated with the usual sanitary defects, in particular want of drainage, filth, and overcrowding, more particularly the latter. There were cases in which internal filth and overcrowding could not be assigned as prominent causes; but in these the streets were undrained; and again, there were cases of sewered streets suffering in more than an ordinary degree, but where the houses were overcrowded and filthy in the interior. In the first category may be mentioned Burlington-street and Hornby-street, in which 144 *deaths* occurred, and neither of which were sewered at the time.”

Dr. Duncan gives the names of a number of other undrained streets, which were not crowded, and yet suffered severely, and proceeds as follows:—“In the second category, of *sewered streets suffering severely from the epidemic*, may be placed Addison-street, Hodson-street, Oriel-street, and Paul-street (and these are the only instances of the kind I can recollect): the three first named, although sewered, are crowded with the lower class of Irish. Paul-street, also sewered, cannot be classed with the other streets named, in point of overcrowding; but as if it were determined that the exception should prove the rule, *an inefficient supply of water* was complained of, both by the inhabitants and by the medical visitor of the street.”

Several instances are given by Dr. Duncan, in which the proximity of offensive slaughter-houses appeared to have determined fatal attacks of the disease. An instance is mentioned of a small court of houses, the cellars of which contained stagnant water, which it was found impossible to remove for want of a sewer. In this court 11 people died of cholera in a single week.

“At the outbreak of the epidemic the town was in a *comparatively* good sanitary condition, from efforts previously made; but since the outbreak the courts in the worst districts have been regularly washed out, the exterior of the houses in those courts have been lime-washed, and the interior of nearly 3,000, in addition to those which have been voluntarily cleansed by the owners or occupiers. Extra scavenging was also employed.”

In Liverpool, as in every town severely visited, the most extraordinary apathy was found to prevail among the poor in *making application* for medical relief, however freely it was offered to them. Dr. Duncan states, that “Bowel complaints, particularly when unattended with pain, were looked upon as trifling, and not requiring medical treatment. Many individuals were collapsed before they or their friends thought it necessary to apply for medical attendance.” It was in order to meet this fatal neglect, that the house-to-house visitation was instituted, but even in districts where it was in operation, many cases of diarrhoea were allowed to go on unheeded, “chiefly from the obstinacy of the parties in refusing to believe that painless diarrhoea could be attended with danger, notwithstanding the plain and repeated warnings which were given.”

Two plans of visitation were tried in Liverpool, one chiefly by lay visitors, the other by medical practitioners, but from a variety of causes of a local nature, already known to the General Board of Health, the system was not so fully carried out as it was elsewhere. Nevertheless, there can be no doubt, that a great number of lives were

saved by it. The following is Dr. Duncan's return of the number of cases discovered during a period of about three and a half months, the largest number of medical visitors employed being 25.

Diarrhœa	10,452
Diarrhœa approaching to cholera	840
Cholera cases	1,391

About a dozen corpses are also stated to have been discovered. The number of families inspected by each visitor varied from 500 to 1,000 a-day, and in addition to the discovery of premonitory cases, these officers reported many instances in which local causes of disease existed in their districts. Dr. Duncan states, that the medical men who were employed in the work of visitation, made many objections to it at the beginning, which in time gradually subsided, and that the visitation was "very efficacious in diminishing the number of cases," while the poor were "grateful, with very few exceptions." The opinions of the medical visitors as to the probable amount of cholera prevented by the measures adopted is thus stated by Dr. Duncan; some believe "that diarrhœa, premonitory of cholera, can seldom be distinguished from ordinary diarrhœa previous to the rice-water stage, and others believe that the greater proportion of the cases would have passed into cholera without treatment."

It has been stated, that both medical and lay visitation were adopted in Liverpool; the former was first introduced, in compliance with the special regulations of the General Board of Health, but it was discontinued by the Committee of the select vestry, and a system of lay visitation was put in force instead. After the *lay* visitation had been in operation for a fortnight, the *medical* visitation was again restored, on account of the renewed interference of the Board. It may be supposed that a fair opportunity would thus be afforded of testing by another kind of statistical evidence, not only the comparative efficiency of the two systems, but also of the whole method, in diminishing the number of attacks, and the consequent mortality of the epidemic. The following is the result of this striking experiment as given by Dr. Duncan:—

"During the two weeks in which *lay* visitation was substituted for *medical* visitation in the parish of Liverpool the cases *discovered* fell from 1,382 in the previous two weeks to 766; and in the following two weeks, when the *medical* visitation was resumed, the cases discovered again rose to 1,484. At the same time the deaths from cholera in the parish rose from 582, in the two weeks ending August 4th, to 790 in the two weeks of *lay* visitation ending August 18th, and again fell in the two weeks (of resumed medical visitation) ending September 1st to 620, after which they steadily declined."

It may be remembered that Liverpool has been for a short period under the operation of a Sanitary Act; and although there has not been as yet sufficient time to carry it out thoroughly, it is gratifying to know that already is its utility becoming apparent. The following facts in regard to this matter are stated by Dr. Duncan in his Report:—

"As an instance of the benefit derived from sanitary improvements, I may mention Lace-street, which, as you know, was formerly one of the most unhealthy streets in Liverpool. In 1847 it was undrained; and in that year about 200 deaths from fever occurred in the street, in

addition to about 250 more from other causes. About the end of 1848 it was sewered; and during the epidemic of the following year (1849) the deaths from cholera were only 36; the total deaths in the borough from cholera falling little short of those from fever in 1847."

"With regard to *registered lodging-houses*, in a certain number whose history I have been enabled to trace, about 150 cases of fever occurred annually previous to registration (excluding years of severe epidemic visitation, such as 1847). During last year the cases of cholera in those houses were 98. In estimating the value of this fact, it must be remembered that the total cases of fever in the town in the years when 150 cases occurred in the lodging-houses (unregistered), were only about 5000; while last year there were not less than 10,000 cases of cholera in town, and only 98 in the same houses, registered and under sanitary inspection. So that, in fact, the cholera in the houses *after* registration was only in the proportion of one to three as compared with fever *before* registration."

Liverpool affords a striking illustration of the beneficial effect of another important sanitary measure, namely, the abolishing of cellar habitations, and sending people to inhabit the *surface* of the earth, as they were intended to do. This illustration is given by Dr. Duncan in a published letter, and is drawn from the results of the fever epidemic of 1847, and the cholera of 1849. The deaths from each epidemic having been nearly equal throughout the borough. In a certain district of the town *before* the fever of 1847 the cellar population amounted to about 12 per cent. of the entire population, and the fever carried off upwards of 500 of the inhabitants of the district. When the closely allied epidemic of cholera appeared, the inhabitants of the cellars in the same district had been reduced to less than 2 per cent. of the entire population, and deaths from cholera were only 94.

WOLVERHAMPTON UNION.—Cholera attacked nearly the whole of this Union, but was especially severe at Bilston and Willenhall, on account of the deplorable sanitary condition of those towns. After the epidemic had been in existence for some time, I was directed to visit the district, and as it appeared that nothing effectual could be done to remedy the obvious localizing causes of the epidemic, especially at Bilston, I suggested, in addition to the usual cleansing and lime-washing operations, &c., that the *special* points requiring attention were, first, the removal of the people to the greatest practicable extent, and second, a constant medical inspection of the whole affected districts. It was found that no suitable buildings could be obtained for places of refuge, and in order to save time the General Board of Health applied to the Board of Ordnance for a supply of tents. A quantity was immediately sent down, and more were offered if requisite. The accommodation thus afforded was made use of at Wolverhampton, but in Bilston and Willenhall, the places where it was more immediately required, I am sorry to say that such was not the case. There were eight medical visitors employed, and Dr. Mannix, who acted as superintendent of the Union, thus reports on the results of the two-fold form of prevention adopted.

"In addition to the duty of prescribing for diarrhœa, the house visitors made daily returns of the various nuisances discovered in the districts, and also of the cases of destitution, and, being for the most

part accompanied by respectable inhabitants, private benevolence was readily directed to the proper quarter.

"Being in possession of the requisite information daily, I was enabled with great effect to remove to the tents large masses of the people, *i. e.* from Wolverhampton, in some cases as many as 40 at a time, who on the removal of the nuisances and purification of their dwellings were restored to their homes. The tents were found to be admirably adapted to provide shelter, and during every variety of weather afforded ample protection, the health of the people being not only preserved, but improved in a marked degree. I have to express my regret, that similar advantages were not afforded to Bilston and Willenhall, where, although tents were provided, local Boards of Health discovered disinclination to supply that accessory accommodation which was essential.

"The result of the house visitation was, that 4093 houses were visited daily; that 5552 new cases were discovered and prescribed for, being at the rate of 23 new cases discovered by each visitor daily; and that no sooner were all the cases of diarrhoea fairly brought under treatment than the disease suddenly disappeared; which result might, indeed, fairly have been calculated on, since the average duration of diarrhoea, when treated, did not exceed 48 hours, and the instances of cholera occurring without being preceded by diarrhoea did not, as far as I was able to ascertain, exceed three or four during the whole epidemic."

DUNDEE.—The following extracts are taken from the report of Dr. Malcolm, who was chairman of the Medical Board of the parishes:—

"On the evening of the 29th May the first three cases of the disease simultaneously broke out in Fish-street, one of the most crowded, low-lying, and unhealthy parts of the town. None of these could be traced to contagion. From the middle of July the epidemic spread rapidly over the town, but usually operated most severely where circumstances favoured its development. This was in general in localities known as being particularly unhealthy, and almost invariably the seat of typhus when it prevailed." In describing one part attacked, Dr. Malcolm states, that it "lies on an elevated part of the town, but the houses in it, where the disease appeared, were dirty, low-roofed, and badly ventilated; some nuisances also existed in their immediate vicinity. The quantity of good water is very deficient in this neighbourhood." He describes another severely affected locality as "low-lying, damp, overcrowded, and deficient in the supply of water. The disease was very fatal here; out of a population of about 100 about 40 died from it, and some respectable people in the neighbourhood fell victims." Other affected districts are stated to be "low-lying, the lanes, courts, and closes entering from them are numerous, narrow, dirty, and much overcrowded. The houses are filthy, and the stairs leading to them are seldom washed down. In these localities, during the whole time the disease remained in the town, cases were ever and anon occurring." A large crowded block of buildings where the disease located itself is thus described:—"Dudhope-crescent consists of about 17 large houses closely built together, and each containing five floors. They occupy a space of about an acre of low-lying damp ground. Immediately to the east of this crescent is a highly-embanked railway.

On the north the ground rapidly rises higher than the tops of the houses. On the west, separated only by a street, are two large mill-ponds; beyond these is placed the public slaughter-house, and a little further to the west of it is an open space of ground, on which the refuse of the town is deposited. This crescent contains a population of about 1,700, who consist of respectable working people. The houses are cleanly kept. Fifty-seven deaths from cholera occurred here."

"It was generally found that wherever the disease broke out with much violence, some local cause could be detected to account for it. Certain localities of the town, however, which appeared to be in a state to favour its propagation, escaped, with the exception of a few sporadic cases."

The nature of the attacks is thus described by Dr. Malcolm:—"In many instances persons apparently in good health, after a single profuse discharge from the bowels suddenly became collapsed, and died in 10 or 12 hours. Nearly one-fourth of the fatal cases were of this kind. The majority of cases, however, were preceded by diarrhœa of from a few hours up to six or eight days' duration, before the marked symptoms of cholera appeared."

The following were the arrangements carried out by the parochial authorities during the earlier part of the epidemic:—

"The town is divided into three districts, to each of which a medical officer is appointed, whose duty it is to attend and prescribe for the sick poor. Immediately after the appearance of the epidemic an additional medical officer was appointed to each district, and by the medical staff thus constituted most of the cases of cholera which occurred in June and July were attended. Wards in the infirmary were opened sufficient to accommodate 12 cholera patients. Many nuisances were removed from different parts of the town. The lanes and closes were well washed by means of the fire engines and water-plugs; and wherever the disease existed they were sprinkled with chloride of lime, and the inhabitants were urged by the medical officers and the parochial authorities to make early application for medical aid when they were seized with any of the premonitory symptoms of cholera, and to be careful in keeping their houses clean, and to avoid habits of dissipation."

These means were, however, found to be insufficient to meet the emergency. Dr. Malcolm states, that "great difficulty was often experienced in inducing the patients to make early application for medical assistance, and from this cause diarrhœa was often allowed to go on unchecked for three or four days, till it ended in collapse." A very striking instance of this fatal neglect is given by Dr. Malcolm, which will be found noticed elsewhere.

In the end of July I was directed by the General Board of Health to proceed from Leeds to Dundee to organize the needful preventive measures, Dr. Malcolm's account of which is as follows:—

"On the 30th July Dr. Sutherland arrived here, and more energetic and effectual means were adopted. Each of the three districts was then subdivided into three, and a medical officer was appointed to each of the subdivisions. In this way nine medical men were employed in attending cholera patients. Two advanced medical students were also appointed to each district, who daily went from house to house in all affected localities, each of them daily visiting about 200 houses, in-

quiring into the state of health of the inhabitants, carrying with them medicines, and prescribing for cases of diarrhœa and premonitory symptoms of cholera, and urging the necessity of early application for medical relief. The students immediately reported all urgent cases to the medical officer of the district, and a list of cases of diarrhœa, premonitory symptoms of cholera, and cholera was daily made up and forwarded to the General Board of Health. Of the nine medical officers three in rotation, with one of the students, remained in attendance during the night, in a house used by the Parochial Board for their general business. This house is in a central part of the town, and is well known to the poorer classes, who were duly informed of the arrangement. In this way every urgent case was promptly attended. Six dispensaries were opened in various parts of the town, where medicines were prescribed to all necessitous persons who were suffering from any of the premonitory symptoms of the disease."

"By orders of the Factory Inspectors a daily medical inspection of all the workers at the different mills was instituted" (this was done at the instance of the General Board of Health); "additional accommodation was procured for cholera patients in the infirmary, and for convalescents. A House of Refuge was also erected, into which the surviving inmates of any house where a death from cholera occurred were freely admitted, and kept till their own house was cleansed, washed with quick lime, and properly dried." "The inmates of the House of Refuge were examined twice a-day by one of the medical officers, and, though many cases of diarrhœa occurred amongst them, only three or four were seized with cholera, all of whom were immediately removed to the infirmary. None of the medical officers or students were seized with cholera, nor were any of the nurses or others connected with the infirmary."

"The dirty lanes and closes all over the town were cleaned and washed with quick lime, and also most of the houses occupied by the poor, in which a death from cholera took place.

"All the members of the medical staff here, are of opinion, that by actively following up these preventive measures, many cases which would otherwise have run on to cholera, were found out and successfully treated in the premonitory stages of the disease, and in this way, many valuable lives were saved.

"The washing with quick lime and the removal of the healthy from the diseased localities were also found most useful in preventing the spread of the disease, and very few cases of cholera were reported from the houses which had been washed."

The following were the cases treated under the visitation system :—

PREMONITORY CASES.				CHOLERA.	
Dispensary Cases.	Diarrhœa Cases Discovered by Visitors.	Cases approaching to Cholera Discovered by Visitors.	Total Premonitory Cases treated.	Premonitory Cases passed into Cholera.	New Cases.
3670	6417	705	10,792	64	924

Of the premonitory cases reported as having passed into cholera, 7 were diarrhœa cases, and 57 was the whole number of those caught in the rice-water purging stage ; all the rest were cured.

HAMILTON.—This small town, with a population of about 9000, suffered severely. The outbreak of cholera began on the 24th December, 1848, and continued till March 7th, 1849, during which period 440 cases of cholera and 251 deaths took place. A house-to-house visitation was begun at my request on the 26th January, 1849, and from the commencement of the disease till the 28th, the date at which we may suppose this measure came into full operation, the cases of cholera had been 209 and the deaths 128. The following are the statistics of the epidemic under the visitation system.

PREMONITORY CASES.			CHOLERA.		
Dispensary Cases.	Diarrhœa Cases Discovered.	Rice-water Purging Cases Discovered.	Passed into Cholera.	New Cases.	Deaths.
170	659	166	21	231	123

Of the cholera cases, 15 are reported as having occurred in private practice, and in 15 instances the patients, though visited in the diarrhœal stage, denied being ill. It is worthy of remark that on one day all the cases of cholera, 3 in number, took place in houses which had been accidentally omitted in the daily visitation. No deaths took place in diarrhœa or rice-water purging cases, and 19 of the former passed into the rice-water purging stage of the disease. No fewer than 91 cholera cases were reported as "sudden," but on close examination most of the seizures were found to have had neglected premonitory symptoms, and the majority of these cases must, therefore, be placed among those in which the patients denied being ill. Dr. Steven, who acted as Medical Superintendent, reports as follows :—

"Previous to my entering upon duty, diarrhœa and rice-water purging were not taken into account at all. From the 20th to the 25th (January), there were known 17 of the former alone, and on the 26th, when visitation from house-to-house was begun, the number rose all at once to 20, after which it kept high for a considerable time. To any one at all conversant with the peculiar character of cholera epidemics the foregoing facts cannot fail to be interesting. They afford the strongest evidence of the advantages of a system of finding the disease and treating it, at its earliest period : a system of daily visitation from house-to-house, such as has been carried on here, with not less happy results than have been obtained by it in other towns similarly visited."

The usual effect of the system of visitation on the ratio of mortality was also observed in Hamilton. Out of 209 cases of cholera occurring before the plan was adopted, 128, or 61 per cent., died ; while of 231 cases occurring under the house-to-house visitation, 123, or 53 per cent., were fatal. These results show the epidemic to have been of great severity, but they also prove the benefit of the early treatment insured by the discovery of the cases.

GLENGARNOCK IRON WORKS.—While cholera prevailed in Glasgow it attacked a number of villages in Ayrshire, chiefly inhabited by persons engaged in the manufacture of iron. I select one of these as an illustration, because the population was small in number, and was completely under the control of the medical officers, so that every epidemic case for each day was known and tabulated. The locality alluded to is the Glengarnock Iron Works. The village contains about 1183 people, and was placed under careful inspection by Dr. Miller, and Mr. Carleton who was engaged to aid in carrying out the needful preventive measures. Mr. Carleton states in his report that the proprietors did a great deal to protect the people by providing a proper water supply, cleansing, whitewashing, and fumigating of houses, and in warning them to be temperate. Whenever the diarrhœa appeared “the system of house-to-house visitation,” says Mr. Carleton, “was put in full force, the inhabitants were seen often during the day, and we discovered many cases of diarrhœa with rice-water dejections, which from early treatment we were at once able to check. In this manner it is not difficult to perceive by the report that the severity of the epidemic was in a great measure averted by putting the preventive system in full operation, thereby saving many lives.”

Dr. Miller also writes—“I have attended a great many cases of diarrhœa at Glengarnock Works and the neighbourhood, both before and since Mr. Carleton came here; and I have no doubt many of these would have gone on to undoubted cholera had they not been treated early. From what I have seen of cholera, I am of decided opinion the house-to-house visitation is the most successful plan for suppressing the disease. We had no regular House of Refuge, but we made use of the uninhabited houses for that purpose. I may remark that three-fourths of the diarrhœa cases were discovered through the house-to-house visitation system.”

In another part of the report Mr. Carleton describes the miners of this district as “a most reckless and dissipated class of beings,” and states that in some cases they refused to take medicine for fear of being poisoned.

I have transferred the statistics of the attack to the diagram in Plate 14, but in this case the epidemic is treated as a *unity*; that is, each curve marks the *total epidemic cases* between it and the base line, so that the real index of the progress of the epidemic is the dotted black line, while the lines below it mark the progressive stages of the disease.

COATBRIDGE.—This town is situated in Old Monkland parish, and is the centre of a large mining and iron district. Cholera prevailed extensively over the whole neighbourhood, but the statistics do not afford sufficient data to show the precise results of the preventive measures employed. These were, however, the usual cleansings, dispensaries, and house-to-house or district visitation by medical officers. The returns from the town of Coatbridge, which contains a small part only of the population, namely about 4000, give the following proportions of cases, which prove the extent to which the disease prevailed over the district and the efficacy of the means adopted ---

Diarrhoea	2659
Vomiting, purging, and cramps	480
Rice-water purging	175
Cholera cases	107
Deaths from cholera	61

CARNBROE.—The village of Carnbroe is situated at a short distance from Coatbridge, and is inhabited by a population engaged in manufacturing iron. It was attacked by cholera on the night of the 31st of December, 1848, and suffered more suddenly and severely than almost any other locality with which I am acquainted. The population does not exceed 1,200, who were all in good health up to the night in question. They had been visited by Dr. Cullen, of Airdrie, in the forenoon, and he states that all were well, and that no premonitory symptoms existed.

The people, however, had been drinking largely, as is the custom at the conclusion of the year, and this no doubt had predisposed them to the disease. At midnight of the 31st, Dr. Cullen was sent for, and on his arrival found the first patient, a man, already in the stage of collapse. Other three cases of cholera were also found, one of which was collapsed, and two cases in the premonitory stage.

In the course of the morning a great number of persons were seized with premonitory symptoms. The disease rapidly extended itself. On the morning of the 1st of January, 1849, five cases of cholera and one death took place. Within the next 24 hours no fewer than 40 cases and 13 deaths had occurred; and such was the terror inspired by the event that one man committed suicide by cutting his throat.

I was informed of the state of this village on the night of the 2nd January, by the manager of the works, Mr. Reid, and directed him to institute a continuous house-to-house visitation, beginning as soon as he could get there; and on the following morning I went out myself to examine into the state of the people. One of the visitors told me that nearly every person in the village was suffering more or less from the epidemic.

Dr. Cullen immediately undertook to see the houses properly visited, and the inspection was kept up till about the end of February, when the disease had nearly disappeared.

Within this period there were about 1100 people attacked out of a population of 1,200. The disease was extremely severe, and required active measures to subdue it. Almost all the cases had a tendency to pass into developed cholera, but such was the result of the speedy and effective treatment adopted, that not more than 240 cases became cholera, about 50 of which occurred at the first outbreak of the disease; and of this number 94 only died, and one-half of the entire mortality took place within the first week or ten days from the beginning of the attack. The premonitory cases averaged from 20 to 30 a day. The great amount of work thrown on the medical staff rendered it impossible to keep very accurate statistics, but the following Table will give the proportions in which the cases and deaths happened each day, for the first three weeks of the epidemic.

Date.	Cases.	Deaths.	Date.	Cases.	Deaths.	Date.	Cases.	Deaths.
1848.			1849.			1849.		
Dec. 31	5	1	January 8	11	7	January 16	4	..
1849.			" 9	5	5	" 17	1	..
January 1	40	13	" 10	4	6	" 18	..	..
" 2	19	9	" 11	13	..	" 19	4	..
" 3	11	3	" 12	10	4	" 20	1	..
" 4	13	6	" 13	11	2	" 21	..	..
" 5	15	6	" 14	9	2	" 22	..	..
" 6	7	4	" 15	7	..	" 23	2	..
" 7	2	3						

The result of the system of visitation and the active treatment of the disease is well shown in the preceding Table, and there can be no doubt that a great many lives were saved by it.

LEEDS.—Shortly after the occurrence of the first cases of cholera in Leeds, in July, 1849, I was directed by the General Board of Health to proceed thither from Hull to confer with the authorities in regard to the preventive measures. At that time the disease had subsided apparently in consequence of the thorough cleansing which the town had received from a heavy and continued rain. I made the needful inspections, and stated to the Guardians the principles involved in the general preventive measures which might be required should the disease re-appear. I again returned in the early part of October, and met the medical men in order to ascertain the results which had been obtained, the disease then having been on the decline.

The following was the plan of medical relief which had been adopted :—The ordinary division of the township into four districts for medical relief had been preserved; the medical officer of each district having been held responsible for the management of the disease within his subdivision. Thirteen qualified medical officers and 10 assistants had been engaged by the Guardians, making a medical staff of 27 in all. Nine lay visitors had also been employed.

The duties of these medical officers were—1st. To attend to all cases of cholera within the sub-districts allotted to them. 2nd. To visit throughout the affected localities either every house where the disease was most prevalent, or to make known their presence in the particular street or court in such a way as to attract the attention of the people, and to induce them to give information of any cases of illness that might be in the neighbourhood. 3rd. They carried medicines with them to administer on the spot to affected persons. The lay visitors were employed to aid in this work of visitation, and they generally either sent the cases discovered to the medical officer of the district, or reported them to him. Another part of their duty was to see to the burying of the dead, and to the reporting of all nuisances, or houses requiring cleansing. The police force often performed similar duties, in warning the people, and informing them of the arrangements made for their protection.

There were two dispensaries, one of which was at the workhouse. But in addition, the surgery of every medical man employed by the

Board of Guardian's became a place of relief for applicants, who were treated on the spot, and their names and addresses taken down, and subdivided among the district medical officers at stated hours each day. At a meeting which I had with the medical officers, they stated in evidence their unanimous opinion, that, so far as the preventive measures went, they had been efficacious in preventing the development of cases of cholera, while a great number of cases of the disease had been brought under treatment before the period of collapse. Many cases of cholera nevertheless occurred, and this marks a certain incompleteness in the machinery, which was partly attributed to the fact, that, at the period when the disease was at its worst, it was found to be impossible to obtain a sufficient number of medical men to act as visitors. A considerable mortality also arose from the neglect of the people themselves. It may be stated in illustration, that numerous instances occurred in which no application for medical relief was made, although the parties knew quite well what to do; while in other cases persons denied being ill who were actually suffering from diarrhoea when seen by the medical officer on his visitation, and to whom he was subsequently called when they were in hopeless collapse. It had also happened that when the medical officer had called at a house, cases of cholera in a collapsed state were actually in the house at the time, without the inmates giving information. In one house two such cases were found by the visitor, and a number of similar instances were reported. Persons sometimes suffered because they obstinately refused to take medicine.

The reporting of cases was not so thoroughly done as could have been desired, which was attributed to want of time when the disease was most severe. A number of returns had however been sent in, of which the following aggregates will probably give the *ratios*, though not the whole numbers for the township:—

Simple Diarrhoea.	Dysentery.	Choleraic Diarrhoea.	Cholera.	Premonitory Cases passed into Cholera.
5,129	1,484	1,273	1,090	18

By extending these ratios over the whole township, it will be obvious that a great number of cases were arrested in their progress towards cholera; while the very small number which passed into the developed state of the disease must occasion regret that the visitation could not be made more complete at the time it was most required.

There was a house of refuge and two cholera hospitals opened in Leeds during the epidemic.

In regard to the workhouse, Mr. Taylor, the medical officer, writes,—

“I am happy to say that we have not had a single case of cholera, which I attribute entirely to its premonitory symptoms having been carefully watched;” and he also says, “the visitation from house to house was exceedingly useful, and I doubt not has been the means of saving many lives.”

SUNDERLAND.—By direction of the General Board of Health, I pro-

ceeded to Sunderland on the 13th March, to organize the preventive measures required for the Union. Diarrhœa prevailed chiefly in the more elevated and healthy parts of Bishop Wearmouth, where there were only two or three cases of cholera; but the disease itself was located in Sunderland parish, where the sanitary conditions were most congenial. Few places were altogether in a worse condition than the affected parts of the borough, and I cannot but attribute the comparatively small number of cases, to some extent, to the improved water supply carried into these districts before the epidemic appeared.

The chief means of cleansing I advised, was washing the streets and lanes, and flushing the sewers with the fire-engine, the water for which was forced upwards from the river. The disease immediately subsided on the use of this measure, but increased in a few days, and again nearly disappeared after a heavy rain-fall, which produced a thorough cleansing. The same occurrence took place a second time after rain, and cholera then disappeared entirely.

The preventive measures adopted were house-to-house visitation, an open dispensary, a house of refuge, lime-washing of affected houses, &c. The first return was made on the 17th of March, and the last on the 26th of April, between which dates the following cases had occurred in Sunderland parish:—

Dispensary Cases.	Diarrhœa Cases Discovered.	Cases approaching to Cholera.	Cholera.
243	125	38	77

One peculiarity of the disease in Sunderland was the small proportion of cases which had a premonitory stage, while the diarrhœa cases had a strong tendency to pass into cholera. The following is the history of the cholera cases as reported by the Union medical officers:—

Sudden cases	62
Cases in which the patients concealed the premonitory symptoms	13
Diarrhœa cases which passed into cholera	2
Cases approaching to cholera, which passed into the developed form	1

It is probable that the number of sudden cases reported is greater than ought to have been the case, on account of the difficulty of ascertaining the truth; but it is very satisfactory to perceive how small a proportion of those actually caught in the earlier stages of the disease passed onwards to cholera. The total number of houses visited was 8,418, or about 200 a-day. There were 156 houses, 457 apartments, and 150 staircases and passages, cleansed and washed with quick-lime. Only a small number of persons entered the refuge, but many left infected houses of their own accord.

EDINBURGH.—The city of Edinburgh was the first part of the United Kingdom attacked by cholera. The sanitary condition of the affected districts was at the time most defective, even in regard to the

removable causes of disease; but it is to the credit of the local authorities that they proceeded immediately and vigorously with the abatement and removal of nuisances, and with the cleansing of filthy streets and closes. For the latter purpose, water at head pressure and a hose were used with great advantage. The first set of special regulations issued by the General Board of Health were addressed to the five parishes of Edinburgh and Leith, and contained the usual provisions, which were not, however, carried out with equal efficiency by all the parishes. One provision, that of house-to-house visitation, does not appear to have been adopted in any parish. The preventive measures chiefly relied on were an excellent system of refuge, lime-washing of affected localities, open dispensaries and notices, and adequate medical attendance. There was also one large and excellent hospital opened by the City parish. It was by far the best establishment of the kind in use in any of the districts under my inspection.

The house of refuge of the City parish was a large new school, very well situated and in every way adapted for the purposes to which it was set apart. The wards were clean, lofty, well lighted, and well ventilated, and the inmates were treated with every care and consideration. The total number of persons admitted into the refuge from affected houses was 270, and amongst these there occurred not a single case of cholera.

The lime-washing of affected districts was carried out to a great extent in the worst parts of the Edinburgh parishes. This process appears to have been mainly relied on as the most effective preventive measure, and I know no city or town where it was adopted to anything like the same extent. It was in Edinburgh that the practice was first successfully adopted to put an arrest on the progress of epidemic typhus, and there can be no doubt that it operated as beneficially in diminishing attacks of cholera in the fever localities. The Canongate parish had nearly every close in it lime-washed; and on making visits of inspection I often found the washers at their work. This poor parish escaped with comparatively little disease.

In a communication received from Mr. Hay, Inspector of the Poor of the City parish, he states that in that parish "the places cleansed by lime-washing and fumigation, were 21 closes, 300 houses, 1060 single rooms, 926 passages, and 1130 flights of stairs. The cleansing was done by a staff of men, at the expense of the Board, recovered in a considerable number of cases from the proprietors." The affected portion of the City parish contains about 20,000 inhabitants, and the amount of lime-washing must appear considerable to any one who knows the structure of the houses. It will be seen that the main preventive measures were directed to the diminishing of the absolute number of epidemic attacks, and this may account for the fact that the deaths reported during the late epidemic were only about one half of those reported during the epidemic of 1832, while in all those towns where equally effective sanitary measures were not adopted, the mortality was very much greater from the late than from the former epidemic.

The following abstract of the Police Returns, from the beginning of the epidemic to the 18th of January, 1849, gives the approximate numbers of attacks and deaths:—

	Cholera Cases.	Deaths.
Edinburgh . .	801	448
Leith . . .	244	86
Newhaven . .	30	20

BRISTOL.—The preventive measures in this city were carried out by the Corporation of the Poor of St. Peter's Hospital, with the co-operation of the other local authorities. At the time the cholera appeared the parochial authorities appointed Mr. Samuel Goldney to act as their medical superintendent, and they proceeded to prepare the worst parts of the town for the epidemic.

In certain parts of Bristol there are notorious fever localities, which were at once dealt with in compliance with the advice of the General Board of Health. A whole street of fever-courts was thoroughly cleansed and lime-washed, so that, on comparing its condition with what it formerly was, the locality could hardly be recognized. All streets requiring constant attention were reported regularly to the proper authorities, and were preserved in a good sanitary condition, so far as the removable causes of disease were concerned. Mr. Goldney reports the results of these measures as follows:—

"The lime-washing operations were continued throughout the whole time of the epidemic, and certainly obtained immunity from attacks of cholera, even in the most notoriously unhealthy districts. Nearly the whole of a large fever-district was washed prior to the appearance of the cholera, and escaped." Mr. Goldney also states that "wherever the disease appeared there were obvious localizing causes, viz., defective drainage, want of water, &c."

From extensive examination I am firmly persuaded that the chief localizing causes of the epidemic in Bristol were connected with the state of the permanent works. The drainage was in many places positively injurious to public health, and the state of the water-supply and privies in the affected localities perhaps worse than I have seen it in most other places.

These special local causes led to sudden and fatal seizures of circumscribed localities, a great number of persons being struck down within a few hours, and a high rate of mortality prevailing.

The medical preventive measures adopted by the guardians were as follows: the city was divided into five districts, with a medical officer to each, and such a number of qualified assistants as might be required to meet emergencies. The medical officers also acted as district visitors. Dispensary relief was freely given. An hospital was opened, of which the medical superintendent took charge, and a suitable staff of nurses provided. During the early part of the epidemic there was unfortunately no house of refuge, and although I urged the absolute necessity of this measure on the Board, there were found to be great local difficulties in obtaining one, from prejudice and the want of consideration of persons who ought to have afforded every facility for the saving of human life. The nature of the localizing causes and the sudden and fatal character

of the attacks rendered the removal of the people absolutely necessary and subsequent experience fully proved that many lives might have been saved had earlier accommodation been obtained. In consequence of the difficulties which had been experienced in this matter, and the great urgency of the case, I deemed it to be my duty to address a written declaration to all the local authorities in the city, calling on them to lend their aid in obtaining suitable premises. The result was, that in a few hours a suitable house was found, and the same night persons were received into it. From this time it was continually in use, and the result is thus stated by Mr. Goldney:—

“The number of inmates in the house of refuge was constantly varying. The largest number in at one time was between 50 and 60. It was visited twice a-day by a medical man, and no cholera occurred. There were occasionally cases of premonitory symptoms, but nothing serious. The total inmates admitted amounted to 210.”

The following striking illustration of the utility of the house of refuge is also given by Mr. Goldney:—

“In a certain lodging-house in Bristol there were 35 attacks of cholera and 33 deaths during the epidemic of 1832. There was then no house of refuge in existence. During the late epidemic a case of cholera occurred in the same house, and I went, and by the aid of the police turned out of it 64 people, 49 of whom were sent to the house of refuge. Out of that number not a single case of cholera took place, but there was a good deal of diarrhœa, which was immediately arrested.”

In addition to the customary district visitation of the medical officers, I recommended the practice, so useful elsewhere, of concentrating the staff on the affected localities, so as to bring as many cases under treatment in the early stage as possible, and Mr. Goldney states, as “the result of these active measures, that a very large number of cases were arrested and prevented from going into cholera, and many lives consequently saved.”

During the whole period of the epidemic a prodigious amount of diarrhœa prevailed in Bristol, but the outbursts of cholera were chiefly confined to well marked, defined, bad localities, and along the banks of the river Frome. This peculiarity of attacking particular spots and leaving the interspaces nearly unaffected, or chiefly suffering from diarrhœa, was strongly marked, and afforded many most instructive illustrations of the truth of the principles of sanitary science.

The amount of premonitory cases of all kinds treated was enormous, as the following general results of the statistics from the 10th of June to the 18th of October will show:—

PREMONITORY CASES.				CHOLERA.		
Dispensary Cases.	Diarrhœa Cases discovered.	Cases approaching to Cholera.	Total Premonitory Cases treated.	New Cases.	Deaths.	Recoveries.
10,477	3,546	717	14,730	789	445	344

The daily statistics are given in Table IX., which also exhibits the peculiarities of the epidemic seizure of Bristol. It will be observed that

the latter is made up of a succession of outbreaks of the disease, which occurred each in a different locality. The effect of the preventive measures is also well marked, by using the "Cases approaching to Cholera" as an index. The plan of relief in these local attacks was, as has been said, to concentrate the medical staff on them; and the proportion of cases arrested by this procedure is shown to have increased after each outbreak, and to have been followed by an immediate diminution of the cases reported as cholera, generally on the same day, which may be accounted for by the practice of reporting the cases every morning for the preceding 24 hours; so that, although the effect appears in the table to have been synchronous with the cause, it might have followed some hours later.

The number of premonitory cases which passed into cholera was exceedingly small; only one or two diarrhœa cases, and about half-a-dozen of those reported as approaching to cholera, having proved fatal. With one solitary, but important exception, to wit, the want of a house of refuge in the early part of the epidemic, the preventive measures were very well carried out in the city of Bristol.

SECTION V.

COMPARATIVE RESULTS OF THE TREATMENT OF CHOLERA CASES, AT HOME AND IN HOSPITAL.

THE results of the treatment of cases of cholera in hospital, as compared with those of home-treatment, have fully borne out the statement made in the first notification of the General Board of Health, in regard to the experience of the former epidemic, namely, that "the establishment of cholera hospitals was not successful." When we consider the wretched, over-crowded dwellings occupied by a great proportion of the parochial cholera patients, and the apparent impossibility of bestowing on them that amount of medical care and assiduous nursing which they so much require; and when we contrast with this the great apparent advantages possessed in hospitals for the treatment of so virulent a disease, we should naturally expect the balance of recoveries to be in favour of the latter. The parochial surgeons had in general every disadvantage to contend with in the home-treatment of cholera, while the patients in hospital were watched over with unremitting care, by night and by day, and every appliance of the healing art brought to bear on their cases. I believe that nothing was left untried which afforded the patients a chance of recovery, and yet the statistical results of the two modes of treatment preponderate greatly in favour of leaving the patient at home.

I select as illustrations the following returns from three cholera hospitals in Glasgow, and four in Liverpool, and place them in contrast with the results obtained by the district surgeons in their home treatment:—

	Cases treated at home.			Cases treated in hospital.			Percentage of deaths to cases treated at home.	Percentage of deaths to cases treated in hospital.	Excess of percentage of deaths in hospital.
	Cases.	Deaths.	Recoveries.	Cases.	Deaths.	Recoveries.			
Glasgow .	1184	415	769	1186	649	537	35.	54.7	19.7
Liverpool .	3984	1494	2490	854	450	404	37.5	52.7	15.2
Total .	5168	1909	3259	2040	1099	941	36.9	53.8	16.9

It will thus be seen that, out of 5168 cases treated at home, the deaths were 1909, or 36.9 per cent. ; while out of 2040 cases treated in hospital the deaths were no less than 1099, or 53.8 per cent., making a difference of 16.9 per cent. in favour of home-treatment ; which, on the whole number of hospital cases, would amount to the saving of about 345 lives.

There is but one circumstance which can account for this enormous difference, and that is the fact of *removal*. Many of the fatal cases were transferred to hospital in an early stage of the disease ; and it was a general instruction to all parochial surgeons, on no account to direct the removal of a case to hospital which was at all approximating to the stage of collapse. I have known a patient taken out of bed with a warm skin and a good pulse arrive in a state of fatal collapse at the hospital, though not above a quarter of a mile distant. The effect of distance has even been made the subject of statistical inquiry ; and although the number of cases which have been examined into is not, perhaps, large enough to obviate error, yet the results are so very striking as to be worthy of notice. At the Woodside cholera-hospital, Glasgow, it was found that, out of 32 cases brought from the immediate neighbourhood, the deaths were in the ratio of $37\frac{1}{2}$ per cent., whilst out of 64 cases, brought from more distant localities, the deaths were about 47 per cent.

A similar observation as to the effect of *distance* in increasing mortality was made by Dr. Duncan in Liverpool. The parish had three cholera hospitals ; one in Queen Anne-street, at some distance from the infected districts, and other two close at hand, in the infected districts themselves. The results were as follows :—

	Cases.	Deaths.	Recoveries.	Per cent age of deaths to cases.
Queen Ann-street hospital	337	192	145	56.9
Vauxhall-road and Ansdell-street hospitals .	433	215	218	49.6
Excess of percentage of deaths in Queen Ann-street hospital . . . . .	..	..	..	7.3

Dr. Duncan says, in regard to this result, "You will observe that the mortality in the Vauxhall-road and Ansdell-street hospitals, situated in the infected localities, was less than in the Queen Anne-street hospital, to which I objected, on account of its distance from the cholera districts, although the vestry had the coolness to refer to the comparative mortality as a proof that they were right, and that I was wrong."

The experience of Glasgow, in regard to hospital treatment, is worthy of being recorded, because the question received the consideration of a large and intelligent staff of medical officers; and their opinion is thus stated by Dr. J. M. Adams:—

"Almost from the instant of an attack a cholera patient may be considered as engaged in a death struggle. To be raised in this dying condition, carried along crooked stairs and narrow passages to a cholera van, to be then rattled and jolted for a distance of a half-mile or upwards, followed by a second transference to the hospital ward, cannot be considered an unimportant process by any medical man who has witnessed the disease. I set aside any consideration of the probable effect on the mind of a patient, as I have observed that in cholera the patient is singularly apathetic, presenting in this respect a contrast to a fever patient. At first, when I had all my experience to gain with regard to the treatment of cholera, I was favourably disposed to the employment of hospitals, and looked with painful apprehension to the treatment available to the sick poor residing in dwellings abounding in negations, *sans* food, fire, bedding, clothing, light, air, quiet, attendance. &c. I am now, however, clearly satisfied that a pauper patient lying on his wisp of straw, on the bare floor, with a relative or other attendant to supply him with a drink of cold water, and to surround him with a few hot bricks, has the chance of recovery fearfully diminished by removing him to all the comforts and refined treatment of an hospital. If my experience on the subject were singular, I would hesitate to venture so decided an opinion; but from careful inquiry which I have made among many of the parochial surgeons, I find their experience so entirely corroborative that I feel justified in condemning the principle of hospital treatment for cholera patients."

There are, however, circumstances under which some sort of hospital accommodation will perhaps always be required during cholera epidemics; but this should consist of scattered rooms, as near the affected houses of the worst districts as possible. A good rule to take in their selection would be to inspect carefully the usual fever nests of towns; to consider them as attacked by cholera, and to estimate the number of apartments in which it would be *impossible* to treat cholera cases. The additional accommodation should be placed as near to these localities as practicable. This is the result of the whole experience of the late epidemic; but I have no difficulty at the same time in giving a very decided opinion against "cholera hospitals," as the special means of treating the disease. The congregating together of a number of patients labouring under a mortal pestilence, and brought from all distances, under any plea of humanity, must henceforth be abandoned. It is fatal to the sick, and tends to impress upon cholera a much higher percentage of mortality than really belongs to it. So thoroughly am I convinced of this, that were it impossible to find suitable rooms near enough to the

worst districts of the worst towns, I should make the home-treatment of cholera the only alternative by providing no hospital accommodation whatever, and remove the convalescents, as soon as it could safely be done, to proper wards, in an airy, healthy locality.

SECTION VI.

ON THE CARRYING OUT OF THE REGULATIONS IN REGARD TO THE TIMELY INTERMENT OF CORPSES OF PERSONS DYING OF CHOLERA.

IN order to ensure the speedy interment of the dead during the late epidemic, the General Board of Health issued the following regulation to meet the contemplated emergency:—

“And in case of death by cholera, or any other epidemic, endemic, or contagious disease, we hereby authorize and require the last medical attendant upon the person of the deceased, or, in case of there having been no medical attendant, the housekeeper, or person present at the death, or who is in charge of the body, forthwith to notify the fact of death to the medical officer of the district, who is charged with the execution of these orders for the prevention of the spread of such disease. And we do hereby authorize such medical officer to give such directions as may appear to him to be needful in respect to the care, removal, and the time of interment of the body, for preventing the communication and spread of the disease. And we hereby authorize and require all persons to give such information or such assistance to such medical officer, and to be otherwise aiding him, as he may need in the execution of these orders.”

For the purpose of ascertaining in what manner and to what extent these regulations were carried out, a circular was addressed to the medical officers acting under boards of guardians and parochial boards in the larger cities and towns which had been attacked by cholera, and in which the greatest necessity would naturally exist for the exercise of the powers. A number of replies have been received, of which the following is a digest.

Generally the people appear to have been aware of the necessity of interring the body as early as possible; but in a considerable number of cases, either from ignorance or indisposition, there has been a tendency to delay. In such instances the regulations of the Board have come into beneficial operation, but rather by a moral than by a legal agency.

The expostulation of the medical officer, supported, as the people knew it to be, by the power conferred by the regulations, was very frequently sufficient to effect the object.

Mr. Radcliffe, Union surgeon, Leeds, says, “The people were so universally frightened, and dreaded infection so much, that my recommendation for speedy interment was always attended to.” Mr. West, surgeon, Hull, writes as follows:—“The people have in most cases

seen the propriety of early interment, and have yielded to persuasion." Mr. Dunn, surgeon, Wolverhampton, states that the bodies of the dead "have generally been removed without any trouble." Mr. Pearce, surgeon, Plymouth, says that the powers conferred by the General Board of Health have been carried out "by persuasion, and by showing the parties the evils that would probably follow delay."

Mr. Alexander, parochial surgeon, Edinburgh, states that "in one or two instances it has been necessary in order to secure early interment to tell the people that the powers given by the Board would be carried into effect." Mr. Evans, parochial surgeon, Sunderland, says, "I have had no difficulty: the people, believing me to possess the legal power to enforce in case of refusal, have buried within reasonable time." Dr. Dempster, staff surgeon, who was General Superintendent of the Barony parish, Glasgow, states that mild remonstrances with the people were all that was necessary. Mr. P. R. Menzies, parochial surgeon, Glasgow, writes, "I have never seen the power exerted. The mere intimation to the friends that it was possessed by the authorities, and a little gentle persuasion, succeeded in gaining their sanction to the removal."

These replies will give an idea of the kind of influence exerted by the regulations in a great majority of the cases. In a few the medical officer went a step further. Mr. Sargent, surgeon, Plymouth, writes that the powers of the Board were carried out "by frequent persuasions, and sometimes by threats." Mr. Walton, of Liverpool, states that the object was attained "by sending persons with the hearse and threatening them with the police." Mr. Garthside, of Liverpool, states that "the police have in a few instances very much facilitated the arrangements for the early interments, without waiting for the ordinary routine." One medical practitioner states that the powers of the Board were "threatened to be enforced once in private practice."

In a few cases, apparently among the Irish poor, force had to be used; but it is evident from the replies that these cases constituted a small minority. Mr. Noble, surgeon, Manchester, writes that the regulations were enforced "by means of the police, who have met with no decided opposition." Mr. M'Ewan, surgeon, Glasgow, says, "The regulations in my district had never but once to be enforced." Dr. Young, Parkhead, near Glasgow, writes, "The police have been called in when necessary, but there were few cases where this was necessary." Dr. Duncan, Officer of Health, Liverpool, states that the powers of removal have been exercised "not frequently, persuasion having generally been found effectual. Men sent by the parish authorities removed the bodies while the police 'kept the peace.'" Mr. James Harvey, surgeon, Glasgow, states that "in two instances the people left the house and locked the door; the police had to break it open and bury the corpse." Dr. M'Cowan, Edinburgh, says that the power of removal was exercised "by sending the parochial officers, and the people have generally consented."

Such cases have, however, been exceptional; but even where the power was exercised the people have generally consented readily. Dr. Dunbar, of Edinburgh, states in regard to this point, that "the people generally well received the power exercised." Dr. Anderson, of Edin-

burgh, also says that the exercise of the power was "generally well received by the people." Mr. Anderson, Inspector of Poor, Inverness, states that the power was exercised "by the order of the medical attendant, and on the whole favourably, without any objection by the people." Dr. Duncan, Officer of Health, Liverpool, says, that "by the neighbours the interference has been thankfully received." Some objections, however, were made in a few cases by the friends.

The evidence shows that the power has been exercised with much discrimination, judgment, and humanity; and that its exercise has been highly beneficial. The regulation has in fact worked extremely well, and has effected all that could have been contemplated from it, but nevertheless some further provision for the early removal of the dead appears absolutely necessary.

Every one conversant with the dwellings and habits of the poorer classes in England must be aware that overcrowding exists to a great extent in all our large towns, and they must frequently have observed the strange intermixture of the dead with the living which this circumstance at present necessitates. During epidemics, as for example the recent outbreak of cholera, the necessity for some place for receiving the dead previous to interment must have pressed itself on every one who was really conversant with the state of the poor during that terrible visitation.

I have received a great deal of evidence on this subject from medical men in all parts of England and Scotland, a few specimens of which I subjoin. The retention of the dead in rooms occupied as living or sleeping rooms is necessarily almost universal among the poor. During the late epidemic, however, it very frequently happened that two or more corpses were laid out in the room at the same time. I have seen three adult corpses in one room, and a person ill with cholera in the only other room in the house. On another occasion, on a hot summer's day, I saw two corpses in a small apartment in which there were three persons sitting. There was a fire at the same time in the room. Dr. Duncan, of Liverpool, states that he has met with 15 instances of two corpses in the house at the same time. Mr. Trahan, one of the Union officers at Liverpool, mentions 24 such instances. Mr. Cooper, medical officer to Wolverhampton Union, says that he has had 18 or 19 such cases; and similar information has been derived from many localities. Corpses of persons who have died from typhus, scarlet fever, and other epidemics, are also retained for a period beyond what is safe (if, indeed, any retention be safe in such cases). The practice in many districts appears to be to keep such corpses three, four, or five days. Mr. Pearse and Dr. Tripe, of Plymouth, state that they "have seen much evil and delay in cases of death from typhus and epidemics," from the undue retention of the corpse. Mr. Kimpton, surgeon, says, "I have known corpses of persons who died of typhus and scarlatina kept several days in rooms with the living, and believe in some instances it was the cause of disease extending to other persons in the house." Dr. Duncan, of Dundee, writes that interments of persons who have died of epidemic disease are "in general delayed too long amongst the poorer classes." Dr. Roe, of Plymouth, says, "I have seen the coffin lying on the bedstead in one part of the room, the food cooking in another, and the dressmaker making mourning in a third. . . . I have

never known an interment hurried in the slightest degree because the person died of typhus or other epidemic—not even when there was only one room for the living and the dead.” Mr. White, surgeon, Dowlais, writes, “It is a very common event to see a large party of relatives sitting around a table partaking of food, and a corpse lying in one corner of the room.”

It is in vain to look for any alteration in this state of things until proper accommodation for the dead be provided. The difficulty must be obvious, and it has struck many careful observers. Mr. Stott, surgeon, Manchester, says, “I know no instance in which the removal of a corpse from a dwelling-house preparatory to interment took place; *no place that I am aware of having been provided for such purpose.* The withdrawal of the living from the dead would be *most difficult* in the majority of instances. A receptacle for the dead appears a desideratum, and I think would be well received by the people themselves.” Mr. West, surgeon, Hull, writes, “I have known the corpses of persons who have died of typhus, scarlatina, measles, and smallpox, retained in the dwellings of the poor for a much longer period than I considered safe;” and he adds, “there should be immediately provided some places or convenient localities where the poor might deposit their dead under proper regulations, having due regard to their feelings; and although objections would be raised at first, they would soon give way to the urgent persuasion of the persons who would be placed in charge of such depositories.”

Mr. Pearse and Dr. Tripe also point out the importance of providing reception-houses. They say, “We would beg respectfully to suggest the propriety, during the prevalence of malignant diseases, of buildings being provided for the immediate reception of the dead, especially for the working classes, who, in large towns, are generally compelled to live in single, confined, badly-ventilated and badly-lighted apartments.” Other medical practitioners make similar suggestions. Even the poor themselves have felt the evils of being compelled to retain their dead, and have been obliged to resort to precipitate interment. A number of such instances are given by the parochial medical officers in all parts of the country. They chiefly take place in cases where death has occurred in the lower class of lodging-houses, in order that “the room may be occupied again.” In some cases no medical aid appears to have been sent for. Mr. Cripps, surgeon, Liverpool, says, “I have often been called up during the night in order to give a certificate of death, for the purpose of having the corpse interred the first thing in the morning, the person having only died in the early part of the night.” Dr. Duncan, of Liverpool, bears important testimony to the desire for getting rid of the dead in some cases. He says, “During the recent epidemic, from 30 to 40 applications were made to me to procure the removal of bodies, retained for a period longer than I judged safe.”

This obvious necessity led to the actual opening of a reception-house at Leeds during the late outbreak of cholera. Mr. Radcliffe, surgeon to the Union, states that, on the first appearance of cholera in Leeds, the Board of Guardians, at his request, erected such a house in connexion with one of the cholera hospitals; “and to this place,” he says, “I caused to be conveyed many bodies from *single* and other rooms previous to interment—indeed, almost immediately after death:

and when the poor found that the dead were treated with decency and respect, I found no opposition to their being sent there."

Here, then, was a very natural solution, and at the same time a successful one, for a great difficulty arising from the overcrowded state of our cities and towns. Perhaps no clearer proof of the existence of the evil could be given, and no more satisfactory method of getting rid of it indicated, than the preceding evidence affords.

SECTION VII.

ON THE EXECUTION OF THE REGULATIONS OF THE GENERAL BOARD OF HEALTH BY THE LOCAL AUTHORITIES.

THE duties devolving on Boards of Guardians and other local boards by the issuing of the Regulations were of a two-fold character. 1st. As to preparatory measures of a sanitary kind. 2nd. As to the medical relief of cholera and its premonitory symptoms. The evidence obtained during the sanitary inquiries which had intervened between the epidemics of 1832 and 1848, had demonstrated that cholera always localized itself amongst the most neglected part of the population. The causes of this selection of locality had been clearly ascertained, and some of them proved to be easily removable, but others were found to require permanent works for this purpose. The regulations of the General Board of Health were specially directed against the removable causes, which all persons, whether private or public, having any power over them, were required to abate immediately, and Boards of Guardians were directed to see to the execution of the regulations.

In order that they might do this the more effectually, and at the same time exercise the most important and responsible functions of protecting the public health, now reposed in them, a very simple and rational course of procedure was pointed out. The Guardians were required "to direct their clerk to make out from the Register of Deaths, or from the district medical relief books, or other sources from which information may be obtained within the union, a list of places where epidemic, endemic, or contagious diseases, have of late been frequent."

This regulation is of extreme importance, because the places indicated are the invariable centres from which epidemic diseases begin and spread, and cholera had previously *been proved* to obey the law of other epidemics in this respect. Such a list would have told the Guardians at a glance the precise spots on which their preventive efforts required to be expended.

After the preparation of this list the Guardians were required "to cause the medical officers employed by them, or specially appointed for the purpose to visit the places, of which a list shall have been made out as aforesaid, and all such neighbouring or other places within such union or parish as shall appear to such medical officers (from being under like circumstances with the places included in such list or otherwise) to require visitation or examination."

And after making the examination the medical officers were directed

where necessary to certify to the Board of Guardians, local boards, surveyors, owners or occupiers, &c.,

“ all such places as are in a state dangerous to health, or need frequent and effectual cleansing by way of preservation against disease, and such dwelling-houses as are in a filthy and unwholesome condition, and all such nuisances and matters injurious to health as ought to be abated, cleansed, or removed under these regulations.”

This process of preparation was intended to begin all over the country as soon as the regulations of the General Board of Health were issued. Nothing could be more simple than the procedure, but it must be obvious that its whole efficiency depended on the making out of a list of epidemic localities, and directing the medical officers to visit and report on their state, and to certify such precautions as were required. I am warranted by experience in stating that had this process been rigorously carried out the severity of the epidemic attack would have been materially lessened, and a vast number of lives saved; but I am sorry to say that in the majority of instances no efficient steps of the kind were taken, and in many the regulation was totally neglected. It is fortunate that town councils, and other local boards, having cleansing powers, frequently took an independent course, and no doubt much good was done in this way; but in most of such instances the active cleansing operations were not commenced till the epidemic appeared, and in a few they had to be carried out while the disease was ravaging the towns; while in almost all, that concentration of effort on the epidemic localities, and that continued watchfulness over them which could only have been exercised by a rigid adherence to the letter of the regulations, appeared neither to have been understood nor put in force. I am truly glad to have been able to adduce examples of a very different kind, but the undeniable saving of life which resulted only makes the great losses which have arisen from local neglect elsewhere appear the more lamentable.

The provisions of the Contagious Diseases Prevention Act, for removing nuisances, were very generally put in force with greater or less effect; but as *continued cleansing and inspection of fever districts* was the preventive measure really required, the simple abatement of a few nuisances, though praiseworthy in itself and useful, so far as it went, was by no means sufficient to protect the public health.

A true and intelligent sense of the awful calamity impending over the country, and of the unremitting energy which would be required to prepare the population, as far as practicable, to resist it, would have led to the immediate exercise of all the powers granted as soon as they became known, and to their continued exercise until the last footsteps of the epidemic had disappeared from the country.

The preparatory measures, generally speaking, were thus only partially and, as a necessary consequence, inefficiently applied.

When cholera actually appeared more energy was in general displayed. There was more street and house cleansing, and more lime-washing. That these steps did good there can be no question, but a moment's consideration will show that they were not those *mainly* contemplated by the General Board of Health, inasmuch as it was not exactly the time to strengthen the resisting power of a people to enable it to withstand a mortal disease when that disease had actually located

itself amongst them. Whole months of *preparation* would have been required to fulfil the intentions of the regulations.

In some cases I am sorry to say I have found nothing done even while the epidemic was ravaging the towns. All the old localizing causes were left untouched. To all intents and purposes no one fact of sanitary science might ever have been ascertained, so far as the local authorities were concerned; and, as might have been expected, the most disastrous consequences have in these instances ensued.

From the defective manner in which the preparatory measures were carried out, the chief reliance in saving life had to be placed on measures of a medical preventive nature. It was ordered that where extraordinary medical aid is required for persons attacked, or threatened by cholera or epidemic, endemic, or contagious diseases:—In such cases the Guardians were

“authorized and required to provide sufficient medical aid, and in suitable places such medicines as may be required within their respective unions for necessitous persons attacked by cholera or by premonitory symptoms, and to make arrangements for the distribution of notices, stating the places where aid and medicines shall have been provided.”

The Guardians were also required to provide

“suitable rooms capable of accommodating necessitous cases to which persons attacked by cholera, who cannot be properly treated in their own houses, may be conveyed.” It was also required that “rooms or places of refuge should be provided, to which may be removed the families of such necessitous persons as have been attacked with cholera, and also such necessitous persons living under the same roof with or in the vicinity of persons so attacked, as the medical officers acting under authority of the said Guardians may deem it necessary to remove.”

The vacated houses were directed to be cleansed before the families returned.

These regulations comprehend the legal provisions of the Contagious Diseases Prevention Act for the relief of cholera, and the various notifications of the General Board of Health fully explained their object, and the best methods of applying them, while in a number of instances special regulations were issued, enforcing minute details of procedure which were generally initiated or carried out under my own inspection.

With a few exceptions, the General Regulations, as to medical aid, dispensaries, and houses of refuge, were certainly not exercised in such a manner as to fulfil the intentions of the Board: but when special regulations were issued, and their execution seen to, the results generally speaking were highly satisfactory, as has been already shown in the preceding sections of this Report.

Most of the difficulties which were experienced throughout the whole course of the epidemic arose from certain defects in the Act of Parliament under which the regulations were issued, and which could not have been anticipated at the time it was passed.

It was apparently the intention of the Contagious Diseases Prevention Act that the medical relief to be afforded during the continuance of the epidemic cholera should be considered as an extension of the ordinary parochial medical relief; whereas the real necessities of the case required that the Boards of Guardians should, as far as possible, divest themselves of their parochial character and assume the office and

responsibilities of local boards of health, to exercise all those important functions which were required not only for the protection of the parish poor but of the lives of the entire community.

Had the great majority of cases of cholera occurred among paupers, there would have been some show of reason for the parochial arrangement of relief being adopted; but it was very soon discovered that such was not the case, and the woful discrepancy which has everywhere been found to exist between the attacks and deaths occurring among pauper patients and the deaths in the Registrar's Report, shows that the force of the epidemic fell not on the paupers, but on the working classes and small tradesmen. It was no uncommon thing for the Registrar's Report to exhibit a mortality twice as great as the District Surgeon's Return; and in the city of Bristol, where an account was kept of the classes who suffered from the disease, it was found that out of 15,529 epidemic cases in all stages, not above one-fourth occurred among the paupers, the remaining three-fourths taking place among the independent working classes, who were thus thrown upon the parochial medical relief, with no other alternative than to take it as the law had provided, or run the risk of death. It is true that in many instances it was understood that the relief should be extended over as wide a basis as possible, and that the inquiries made as to the applicant should not be of a too particular nature; but it must be confessed that the very placing of any portion of our population, except actual paupers, under a system of pauper medical relief, appears to be a proceeding of so entirely an objectionable character, that nothing but the most pressing necessity could have justified its adoption. No convenience of existing machinery could make up for the mischiefs likely to accrue from it, or from the hardships to which it was likely to have exposed the applicants for relief. Whatever provision was contemplated for the protection of the lives of the working classes during a period of pestilence, ought certainly not to have been a pauper one.

The less obvious but no less injurious consequences which resulted from the arrangement were of the following kind:—With few exceptions, the usual, and under ordinary circumstances the necessary, spirit of a parochial *suspiciousness* pervaded the entire administration of the relief measures. I have frequently found an order for relief required before a dose of medicine could be obtained. At a period when a properly-constituted local Board of Health would probably have carried out relief measures on the widest and most liberal scale to save life, the *money-aspect* of the measures in certain instances appears to have occupied the largest share of attention. At a time when the self-sustaining heads of families were being cut off in all directions, the question appears to have been in these cases not how the largest saving of productive human life could be effected, but what was the smallest increase of rates which the parish could escape with? The kind of inquiries, which are natural to parochial bodies, occupied the chief place in their consideration; and hence the medical assistance provided has sometimes been very inadequate. I have walked through affected districts, and seen the people in terror running about in all directions, seeking for medical aid where none was to be found. I have entered houses, and seen the sick and the dying lying without help. In a

whole district of the metropolis the people were falling before the ravages of the epidemic, apparently without the knowledge that the Legislature had made any provision for their relief. In one town the medical staff was broken up and dismissed in the midst of a wasting pestilence, on account of some paltry pecuniary consideration, and numbers of families were thrown into mourning in consequence; the decisions of one meeting on matters of instant and vital importance having been upset by another meeting called by a cabal for the purpose. I know one case in which, on the very eve of one of the most disastrous outbursts of cholera I have ever witnessed, the medical staff was dismissed, and the dispensaries closed, and where hundreds died without being able to obtain a single dose of medicine.

Similar difficulties arose in the exercise of the power of providing houses of refuge by the parochial authorities. I have already shown the great saving of life which ensued in cases where the Boards willingly provided places of refuge, and the fatal results which must necessarily have followed neglect of the regulations in this important particular. The object and importance of these establishments had been so clearly pointed out in the notifications of the General Board of Health that the absolute necessity of them must have been apparent to the most cursory observation. On the part of some Boards there was often a great unwillingness to open refuges; and on the part of the people there was often as great an unwillingness to enter those which had been provided. I cannot help thinking that the workhouse idea influenced both parties. Indeed I have known a portion of a workhouse set apart for a refuge for persons who abhorred the very name of the place. A great deal of difficulty was often experienced in procuring suitable premises, on account of the violence of local prejudices. I know one instance in which a very successful house of refuge was obtained, in a parish adjoining the one affected; but the guardians of the former, instead of doing all they could to aid their neighbours in their endeavours to save life, tried every means in their power to prevent the house being applied to the contemplated purpose, because they would not allow the "paupers" of another parish to be sent into theirs, if they could help it! This was a case in which many lives had been lost for want of a refuge, and in which not a single case of cholera occurred among the large number of inmates who were afterwards drafted from affected houses into the refuge, when it was obtained.

It should not be forgotten that the house of refuge under the existing law must necessarily have been a kind of poorhouse. It had to be furnished, and the inmates provided with food, bedding, &c. It was natural, therefore, for the guardians to consider it in this light; but yet I have been in refuges where the great majority of the inmates were respectable working people. I have known the popular prejudice, as to the danger of contagion from persons coming out of infected districts, form an insurmountable obstacle to the obtaining of lodgings by working men able and willing to pay for the accommodation. It is hardly necessary to point out the hardship involved in giving working people so situated no other choice than to take refuge in a parish establishment. I have elsewhere mentioned the case of two parishes in which the great remedy required to save the people was their removal

from affected houses. In this case tents were sent for their relief, but the local committees would not put the necessary bedding into them. The people consequently would not use them, and died.

I am desirous of not being misunderstood in the object of these strictures. Any person at all conversant with parochial administration must be well aware of the great difficulties with which the Guardians of the poor have to contend. The parishes might have been left to manage their own sick poor; but the circumstance of requiring them to take charge of the health and lives of our entire working population was to introduce an element of antagonism which could not but be productive of mischief. I have also had complaints made to me of the pauperising tendency of the relief measures in the hands of parochial authorities; and it has been stated that it was found to be very difficult to make persons return to their usual independent habits who had received parish medical relief for the first time, perhaps, in their lives. The evil may be said to have come to a climax when it was found that the General Board of Health had no power to compel the parishes to obey its regulations, and that, in fact, no legal provisions for protecting the people were in existence.

I have endeavoured to do justice to those parishes which willingly carried out the preventive measures of their own accord; and I have shown that a great deal of human life was saved in all the towns by directing the local measures until they were in full operation. I must not be considered therefore as in the slightest degree undervaluing the importance of the great work which has been accomplished. It is possible also that many epidemic attacks may have been prevented by the preparatory measures of Boards of Guardians in parts of the country which did not come within the sphere of my own observations; but I should fail in my public duty if I did not express my decided conviction that many lives were lost which might have been saved, and that this calamity arose out of the very nature of the machinery employed.

Before concluding this section of the Report, I would bear the strongest testimony to the self-denying zeal and the ability with which the medical officers so nobly discharged the highly responsible duties confided to them during a time of great public emergency. The question of remuneration for services rendered by these officers, though not coming under the regulations, nevertheless arises out of the recommendation of the Board that they should be liberally dealt with on account of the heavy additional duties thrown on them. I know a number of instances in which a suitable payment has certainly been made; but the complaints of the miserable remuneration afforded have been so numerous that I question very much whether it would be wise to encounter another epidemic such as the last without other arrangements. I feel satisfied that, in the majority of instances which have come under my own observation, nothing but the dictates of humanity would induce the medical officers to undertake the work anew with the chances of being similarly paid for it.

I have thought it needful to mention these matters, because they have a most important bearing on the management of epidemics; and the whole experience of the late cholera ought to raise the question as to whether, considering the classes of society affected, and the nature of the case, it would not be desirable, in the event of

another attack, and in localities in which it might be deemed necessary, to place the local powers in the hands of a few intelligent and influential inhabitants, perhaps connected with parochial and other local Boards, nominated by Government *to do the special work of prevention*, and to carry out rigorously the relief measures of the General Board of Health; to undertake these duties for the safety of the people, not as a parochial function, but as a most important public trust, to be exercised for a present emergency, and for no other purpose; and to perform these duties only so long and no longer than the emergency required. In this way every objection on the part of the people to the *parish* aspect of the preventive measures would be done away with, the parochial authorities would be relieved from great difficulties, and an adequate extent of aid might be afforded without endangering the independence of the working classes in the laudable attempt at saving them from the ravages of pestilence.

SECTION VIII.

EXTRACT FROM REPORT, ON THE OUTBREAK OF CHOLERA ON BOARD THE AMERICAN SHIP "AMERICAN EAGLE."

THE circumstances connected with the outbreak of Asiatic cholera on board the emigrant ship "American Eagle" appear to me to afford strong proof of the necessity for substituting a system of well-arranged sanitary regulations for preventing, as far as possible, the localization of epidemics on board merchant vessels, instead of the expensive, inefficient, and dangerous system of quarantine now in use. Besides the saving of sickness and life, this case presents an example of the greater saving of time, or, in other words, of money, by the substitution of sanitary for quarantine regulations.

A large vessel which, in an ordinary season, might possibly have carried its crew and passengers across the Atlantic in safety, is laid in dock, close to an epidemic locality (which, moreover, ought to have had no existence there). The stagnant water of the dock leaks into the vessel, and becomes offensive; the ventilation is very defective; an overcrowded population of emigrants is placed on board; their food is unwholesome, and the personal habits of many of them filthy. Possibly all these circumstances might have been inoperative in ordinary seasons; but, during a prevailing epidemic constitution, they become matters of immense importance. Cholera strikes the ship, just as I have seen it again and again strike a similarly circumstanced locality on shore, although few places on land have been altogether so badly situated as this ship has been. The plan of procedure on land is to spread the population, by taking them out of the infected localities. This is absolutely necessary to their safety; while those who are removed, and all in the neighbourhood, are placed under strict medical inspection. Every needful sanitary precaution in the way of cleansing, ventilation, &c., is also enforced. But suppose the "American Eagle"

had arrived in England from a foreign port. If there had been no cholera here, she would have been put in quarantine; her overcrowded population kept in her. No system of medical inspection, or sanitary amendment, would have been possible. I am warranted in stating, from experience in similar cases on shore, that a large proportion of the crew and passengers would have perished in a very short time under such treatment.

Every person of common sense must recognise that the methods adopted at Plymouth in the case of the vessel in question were infinitely superior to such a barbarous expedient as leaving a large number of our fellow-creatures to perish, under circumstances in which death comes in one of its most fearful aspects, and beset with more than ordinary terrors. Had proper care been taken to preserve the neighbourhood of the docks in a proper sanitary state, we have every reason, from experience, to believe that an epidemic centre would not have existed there; and had the requisite precautions been taken on board of the "*American Eagle*," it is equally certain that the crew and passengers would have escaped cholera. But after the neglect has been committed, and the consequences have shown themselves, it is surely a mark of ignorance as well as of inhumanity to subject the sufferers and their friends and fellow-passengers to all the dangers and horrors of a pest ship, in order to ward off some imaginary danger from people at the port where the vessel arrives.

The present case illustrates forcibly the origin of presumed instances of importation of the disease. Should cholera break out in Plymouth or its neighbourhood, a presumption of *importation* might be advanced; and in after years, when all the circumstances are forgotten, the arrival of the "*American Eagle*" at Plymouth, the dispersion of the passengers, and the appearance of cholera in the town, would, no doubt, be placed in the relation of cause and effect in the narrative; but let it be remembered that cholera had shown itself in the neighbourhood of Plymouth *before the arrival of the ship*, and that a man, who had actually been in Plymouth, had died of the disease.

The case of the "*American Eagle*" further shows the importance of preventing the sailing of an emigrant ship, or any other vessel, when cholera has broken out on board. Had this vessel put to sea with her depressed and overcrowded population, a large sacrifice of human life would have been inevitable. The greater purity of the air at sea, and the getting out of the epidemic atmosphere, which the ship by sailing might, perhaps, soon do, may appear at first view to be reasons for her putting to sea with all possible despatch. But this view is a fallacious one, and, if acted on, would involve the certain destruction of numerous persons. Every man, woman, and child, under the circumstances which are here supposed, has been breathing a poisoned atmosphere. That some portion of the poison is already in the system of many of them, and has taken hold of them, is unequivocally shown by the prevalence of the premonitory diarrhœa. To the full development of the disease in every one of those persons nothing is wanting but favourable conditions. Such conditions are combined and concentrated in the intensest degree conceivable in an emigrant ship at sea under the circumstances supposed;—all more or less predisposed to disease; the disease actually existing in some; filth, overcrowding, imperfect ven-

tilation, unsuitable food, panic. The concentration of these conditions, which it requires extraordinary care and skill to prevent, accounts for the fact, that outbreaks of epidemic diseases on shipboard are usually much more extensive and fatal, in proportion to the numbers attacked, than outbreaks in courts and alleys on shore. No matter how pure the atmosphere into which the ship may sail; this purer atmosphere cannot be got to the unhappy passengers. There is no possibility of substituting it for the poisoned atmosphere which is in the ship, which she carries with her, and which her overcrowded population continues to breathe. In port the affected individuals may be removed from the ship, may be dispersed, and placed in a comparatively pure atmosphere, while the ship itself may be thoroughly purified. By these means the progress of the disease is arrested in the persons already affected, and the further extension of the disease is stopped; but nothing of all this can take place at sea. To send a vessel to sea with cholera on board is to follow the example of those Guardians of the Metropolitan Unions, who persisted in keeping their pauper children in the poisoned atmosphere of Drouet's establishment at Tooting, obstinately refusing to remove and disperse them, the result being that 180 perished.

The ship "American Eagle" is of about 1000 tons burden. She left London on the 31st of May, with a cargo and a number of emigrants on board, for New York. She touched at Portsmouth, and took in about half a dozen passengers, which made the whole number of souls aboard 370. Of this number about ninety were German emigrants, who had come over from Rotterdam after having remained there a single night or two, the cholera having been prevalent in that city at the time, and the poorer class of emigrants sleeping in the low class of lodging-houses.

Two or three Germans, who had come over from Rotterdam, are reported to have died of cholera in London, near the place where the "American Eagle" was lying before she sailed.

At the time of her leaving dock all were well on board except a little child, of German parents, which had diarrhoea, of which, however, it recovered, under the treatment of Dr. Brown, a retired medical practitioner of London, who was on board as a passenger to the United States. The German emigrants had been in London for three or four days before the vessel sailed.

The father of the child already mentioned was the first person attacked with cholera. He was taken ill on the 1st June, very suddenly, and when Dr. Brown saw him he was already collapsed, and died in twelve hours from the period of attack.

On the 2nd of June there was no fresh case.

On the 3rd of June one of the sailors took ill. This man had been ashore at London several days without leave, and had been intoxicated. He assisted in sewing up the body of the first patient who died, but, except in this act, he had no communication with the steerage. He died after an illness of twelve hours.

It may be proper to state that the first fatal case happened in a weakly man, who had exhausted himself very much while in London, by attention to his baggage, and moving it from place to place.

Another fatal case took place in an Englishman, who slept in a

berth nearly opposite the first case. He was seized at 11 p.m. on the following morning.

On the 4th of June *four fresh cases occurred*. Two of these were Germans. They slept in the steerage, but their berths were at some distance from any of those in which the preceding cases occurred. Both of them died after an illness of about sixteen hours. Another fatal case occurred in a sailor who slept in a separate fore-castle from the one where the first sailor was attacked. This man was not known to have had any communication with any affected person. He died on the 6th.

About the period when this man was attacked a good deal of bowel complaint began to appear on board, and the captain, with great judgment and humanity, put into Plymouth on the 5th of June. Had he not done so, I am fully of opinion, for reasons already stated, that a very great sacrifice of life must have inevitably ensued.

On the 16th there were no fewer than eight new cases of cholera, three of which—an Englishman, an Englishwoman, and an Irishwoman—died after about six hours' illness. On the 7th of June two Englishmen died. On the 9th (yesterday), when I went on board, there had been twenty-one cases—thirteen deaths, six recoveries, and two under treatment. There were also twenty-five cases of severe diarrhœa under treatment. All these cases will apparently recover; but the epidemic influence, I am sorry to say, has, up till to-day, shown no disposition to abate in activity, for the cases of diarrhœa have been increasing in number; and another German, an old man, was seized with cholera this morning, and at mid-day was in the stage of collapse, in which, I fear, he will die.

I have much pleasure in stating that the authorities in Plymouth have done all in their power to alleviate this great calamity. The "Tyne" hulk was immediately sent by the Admiral to receive the sick and passengers; and an additional medical man, Mr. Fox, was put on board this hulk to take charge of the whole. The authorities permitted all such as chose to come on shore to do so; and as many as one hundred persons have thus been withdrawn from those agencies which appear to have localized the epidemic on the ship and passengers.

The cabin of the "American Eagle" is fitted up with comfort and elegance, and not one of the passengers in it has suffered from indisposition.

The steerage runs under the cabin, and nearly the whole length of the ship. A portion at the stern has been separated as a store-room, into which there are stern-lights, which also answer for ventilation; and there is a wooden grating at the upper portion of the partition, through which air can pass from the store-room into the steerage.

The following are the dimensions of that portion set apart for the passengers:—

Length, 155 feet; breadth, 35 feet; height, 8 feet; superficial area, 5425 feet; total cubic contents, 43,400 feet. This cubic space *includes* that portion occupied by the baggage of the passengers, as well as all that space occupied by the erections for berths, the bedding, &c.

Four ranges of berths, each intended to accommodate two persons, extend the whole length of the ship, interrupted only by the hatches,

two in number, one of which is about eight feet square, and the other about six feet square.

Amongst other purposes, these hatches, if open, will answer to a certain extent for ventilation; but, in addition, there are three of the iron-tube ventilators, one of which is about eighteen inches across the funnel-shaped mouth on deck, and the other two are about fifteen inches in diameter at the same part. Of course, where these tubes perforate the deck they are much smaller in area—apparently not above one-half the measurement stated. Besides these, there are ten dead-lights, five on each side of the steerage. Each is about six inches in diameter, and circular, the glass being capable of opening inwards, so as to afford ventilation.

The total number of passengers accommodated in the steerage was 250—a number considerably below the proportion admitted by the regulation, which is, I believe, one passenger to fourteen feet superficial area: but, after all this is admitted, it will be seen that the cubic space only amounted to about 173 feet for each, including baggage. There can, in my opinion, be no question as to the defect of ventilation on board this vessel. It is quite true that, in this respect, she is better than the great proportion of our own emigrant ships; but to a practised eye the whole amount of air which it is possible to supply to such a great number of inmates, especially during the night, must appear wholly inadequate for the ordinary purposes of ventilation. I have seen no conditions on shore so defective in this matter as those presented by the ship in question, and yet the results on shore are sooner appreciated than they are on board ship. The fresh breeze to which the passengers are exposed during the day on deck is evidently their only safeguard from certain destruction.

The water-closets are very difficult to keep clean, on account of their small number and the filthy habits of many of the emigrants.

The decks were stated to me to be all cleaned every morning, and kept in as good a state as the habits of the people would admit of.

It is complained that the habits of the Germans are so very filthy, that the English and even the Irish emigrants cannot endure them. They appeared to be a quiet, orderly people, but generally not so clean in their persons as either of the other classes.

Bad diet, mental depression, overcrowding, defective ventilation, superabundant moisture (for it is impossible to keep the people from slopping the decks), and, above all, an epidemic stroke coming along with these co-existing circumstances, have, no doubt, all contributed to produce the result.

The outbreak so closely resembles an epidemic seizure of a village on shore, that, in my opinion, it ought to be considered in this light. All the early cases have been sudden, and nearly all have died; and diarrhœa is now very prevalent. This is precisely the history of an attack of cholera in a land population under unfavourable circumstances.

Under ordinary circumstances there was nothing that would have produced more than an ordinary amount of sickness, but quite enough during an epidemic to determine its localization.

A number of people seemed to have been poisoned before the usual results showed themselves; and now that most of the defective con-

ditions have been removed, the symptoms of diarrhœa are present in persons who would, without doubt, have been seized with sudden cholera had the vessel proceeded on her voyage.

The first time I went on board (yesterday) I found the whole ship undergoing a thorough cleansing. The decks, planking, and roofs, as well as the berths, have been thoroughly washed with quick-lime, and disinfected with Sir W. Burnett's liquid; the passengers having all been previously transferred on board the "*Tyne*," or drafted into the town.

On board the hulk all the arrangements have been made for accommodating both the sick and the healthy—at least, so far as circumstances would admit. The sick who are confined to bed are about half a dozen, and are on the lower deck; the healthy are accommodated on the deck above; but this arrangement is still very faulty, for the sick should be by themselves, and the healthy are still too crowded to be safe.*

While on board the "*Tyne*" hulk I summoned the German passengers together, and, through an intelligent countryman of their own, I impressed on them the need of immediate attention to premonitory symptoms, and urged on them to apply to the medical officer on board whenever they were attacked. A similar communication was also made to all the other emigrants.

The only remaining difficulty is in the matter of *food*. It would be very desirable, if it could be managed, to substitute fresh provisions for the salted meats now used. I have expressed this opinion strongly, and I believe that all persons absolutely suffering from diarrhœal symptoms will be provided with the needful change of diet; but there appears no solution for the difficulty on the part of the great bulk of the emigrants.

I suppose there is no power to compel the ship "*American Eagle*" to remain as long as it may be needful for safety; but I cannot help expressing a very strong opinion, that so long as any passenger is liable to diarrhœa, and for several days after this symptom has ceased, there will be absolute danger in proceeding to sea. I have protested verbally against such a step, and shall do so in writing, in order to justify the captain with the owners. He appears a humane and enlightened man, and willing to adopt, to the utmost, every possible precaution. He has done so hitherto, and I think it right to say so.

I have advised that the decks of the ship be thoroughly dried before any one is received on board, and that every available means of ventilation and cleanliness be adopted for the future.

One of Dr. Arnot's air-pumps would do the work effectually. The more I see of shipping, and the more I seek to apply physical laws to the solution of the question of ventilation, the more I am convinced that by a MOVING POWER ALONE can any effectual change in the air in the hold of a ship be accomplished. All ventilating tubes and open hatches are inadequate to the task; and while we have so very simple and cheap a mechanical power at our disposal, it is a duty to recommend and enforce its use whenever we have an opportunity.

Plymouth, June 10, 1849.

* On a representation of this to the Port Admiral, Sir William Gage, he immediately ordered another ship, the "*Andromache*," for the accommodation of the

SECTION IX.

CONCLUSIONS.

THE evidence in the preceding pages leads to the following conclusions:—

First.—That the temporary measures for the removal of the localizing causes of cholera, ordered by the regulations of the General Board of Health, have, *cæteris paribus*, been successful precisely in the ratio of the ability and perseverance with which they have been applied, it having been proved that in some cases they have ensured immunity from attacks, that in others the intensity of the epidemic has been materially diminished, while there is no instance of their having been unattended with success, except where they were inefficiently applied, or where there were local *permanent* causes of disease which they could not remove.

Second.—It has been proved that where, from the nature of the localizing causes, they did not admit of removal by temporary means, the population might be carried through the epidemic period with almost perfect immunity by withdrawing them from the affected districts to places of refuge, and bringing them under strict medical inspection.

Third.—That the great majority of cholera attacks have been preceded by premonitory symptoms of longer or shorter duration, which, with very few exceptions, might in all probability have been speedily checked by *early* medical aid; that, in its fully developed form, the mortality from cholera is not materially lessened by any known mode of treatment, while the whole experience goes to prove that henceforth the measures of medical relief should be directed mainly against the earlier stages of the disease.

Fourth.—That, without entering into any discussion as to whether or not the diarrhœa which prevails during a cholera epidemic be pathologically of the same identical nature as cholera itself, there can henceforth be no doubt that, for all practical purposes, it is absolutely necessary to consider every case of diarrhœa, especially in localities affected by cholera, as part of the epidemic, exposing the patient to danger if neglected, and consequently requiring immediate treatment.

Fifth.—That it has been proved by melancholy experience, that during severe epidemic seizures persons labouring under premonitory symptoms will not, of their own accord, apply sufficiently early for medical aid, and that therefore the great proportion of cholera cases are not seen at all till they are in the stage of collapse. To this circumstance is to be attributed the high mortality of the epidemic.

Sixth.—That consequently the main dependence for arresting the ravages of the disease, and saving human life, must in future be placed neither in any specific mode of treatment nor in trusting to the application for relief of the patient or his friends, but chiefly on an active

and systematic house-to-house visitation by medical officers specially appointed for the purpose throughout all localities where the disease prevails, and the treatment on the spot of all persons found labouring under cholera or its premonitory symptoms.

Seventh.—That there is ample evidence to show that the system of household visitation, adopted during the late epidemic, has been the means of saving a vast number of lives, both by preventing the development of cholera and by bringing many developed cases of the disease under successful treatment which otherwise would not have been seen until the stage of collapse, while it also led to the discovery and removal of many local causes of disease which would have escaped notice.

Eighth.—That it is always advisable to treat cholera cases at home, instead of removing them to hospital, unless such removal be indispensably necessary.

Ninth.—That the most severe outbreaks of cholera have been those connected with very obvious local defects, requiring the execution of permanent works for their removal.

Tenth.—That, with a few apparently exceptional cases easily accounted for, cholera has invariably localized itself in the bad sanitary districts of towns, while the portions in a better sanitary condition have as invariably escaped, either entirely or with the occurrence of the milder diarrhœal forms of the epidemic.

Eleventh.—That the track of cholera and that of fever are identical.

Twelfth.—That experience has proved the possibility of extirpating fever by permanent sanitary improvements and police regulations; and that we are warranted by the preceding conclusion in asserting that it is possible, by the same measures, to prevent the localization of cholera.

Thirteenth.—That although a great amount of present benefit has been derived from the preventive measures of the General Board of Health, the most unremitting efforts should for the future be directed to the extirpation of the well-known and obvious localizing causes, not only of cholera but of other epidemics; and that henceforth this object should be perseveringly aimed at as of paramount importance to the health, moral well-being, and pecuniary interests of the country at large.

Lastly.—That the experience of the late epidemic has proved that this most important public object will be best effected under the watchful superintendence of a vigilant, well-informed, and disinterested authority.

It will be observed that I have confined my observations to the measures of prevention embodied in the regulations of the General Board of Health, and that I have omitted all discussions as to the pathology and treatment of the disease as not forming a part of my public duties; but before concluding this Report, I may be permitted to lay before the Board certain deductions as to the management of epidemics in general, which, although not directly within the scope of my present subject, have nevertheless been very forcibly impressed on my own mind by the experience of the last eighteen months. I feel a conviction that those measures which have been successful in the management of cholera are the very measures which, *mutatis mutandis*, will be found most effica-

cious in coping with typhus, smallpox, scarlet fever, and other forms of epidemic disease which infest large cities. A moment's consideration of the history of these will show that they rarely attract much attention until a considerable mortality has taken place. The germs of disease which always exist in an overcrowded population, breathing a vitiated atmosphere and drinking unwholesome water, are permitted to vegetate and produce their natural fruit of wide-spread pestilence and death before it is in general conceived to be necessary to take any steps for checking the evil. The most complete ignorance in general prevails as to the real condition of the affected localities, and the causes from which the calamity has sprung. No intelligent medical oversight is kept up among the people. The occurrence of epidemics appears to be considered a matter of periodical necessity; and whatever form they assume, the existing law places their management amongst the industrious classes, as well as amongst paupers, in the hands of the parish authorities. A niggardly medical relief is provided, entailing enormous labour on the officers, and resulting in many fatal casualties from over fatigue and exposure in the affected districts; parties are vaccinated for whom application is made; hospital accommodation is generally afforded; additional parochial relief for the sick administered where necessary; and the dead are buried. In the great majority of instances, these measures, which contain no efficient element of prevention, may be said to constitute the machinery at present in use for the management of epidemics. It cannot be too often repeated that epidemics ought not to occur; and that, were our cities properly built, drained, cleansed, supplied with water, and otherwise regulated, they would probably be abolished. Until these objects can be attained, we must content ourselves with doing all that is within our reach. My own feeling is, that the district medical officer should devote his whole time entirely to his special work; and that in addition to his usual duties he ought to keep a constant supervision over all those parts of his district which experience has proved to be peculiarly liable to epidemic or other forms of disease; that his attention should be directed to ascertaining the causes of this peculiar liability, and the steps required for their removal; that the very first appearance of an epidemic should lead to the instant adoption of measures of prevention, with the view of checking it in its first germs. If cleansing be required, it should be done; if the lime-washing of houses in entire neighbourhoods be necessary, it should at once be undertaken; if unwholesome water be the cause, a better supply should be provided as soon as practicable; if the houses be badly ventilated, every possible amelioration should be adopted; and above all, if neighbourhoods be overcrowded, or the disease have appeared in particular houses, the excess of population should be dispersed without delay, or removed to temporary places of refuge, which ought to form part of the standing establishment of all unhealthy cities and towns so long as they continue so. The medical officer should also be vested with certain legal powers for carrying out his recommendations.

These, in fact, have been the very measures adopted during the late cholera; and it appears to me to be absolutely necessary that some more effectual legislative provision should be made for applying them to future emergencies. The enormous local rates which have been levied to

meet the expenses of unchecked epidemic disease ought to be a sufficient argument with persons who cannot be influenced by higher considerations, for calling in question the wisdom of the present system of management, and to show that the subject of *prevention* merits a much greater degree of consideration than it has received, and is far more intimately connected with the vital interests of society than has been hitherto imagined.

I have the honour to be,

My Lords and Gentlemen,

Your obedient servant,

JOHN SUTHERLAND.

London, April 24, 1850.



APPENDIX.

TABLE I.

TOTAL DAILY RETURNS of Premonitory Cases and Cases of Cholera in the twenty-three Districts of the City and Barony Parishes, Glasgow, from the beginning to the end of the Epidemic of 1848-49.

Date.	PREMONITORY CASES.				CHOLERA.		
	Applicants at Dispensaries.	Diarrhœa Cases discovered by Visitors.	Rice-Water purging Cases discovered by Visitors.	Premonitory Cases passed into Cholera.	New Cases.	Deaths.	Recoveries.
1848							
Nov. 11	1	..	..
12	1	..	..
13	1	..
14	2	1	..
15	1	1	..
16	1	..	..
17	1	1	..
18	1	..	..
19	2	1	..
20	4	1	..
21	3	..	..
22	4	..	..
23	1	..	..
24	4	1	1
25	4	4	3
26	7	..	1
27	10	4	2
28	15	3	3
29	11	5	5
30	6	5	2
Dec. 1	9	4	2
2	7	3	1
3	8	2	1
4	10	5	6
5	7	2	4
6	3	5	6
7	4	2	2
8	3	2	7
9	5	1	1
10	5	4	4
11	1	3	2
12	9	2	..
13	9	5	2
14	5	1	4
15	17	7	4
16	22	10	5
17	11	11	6

Premonitory and Cholera Cases—*continued.*

Date.	PREMONITORY CASES.				CHOLERA.		
	Applicants at Dispensaries.	Diarrhœa Cases discovered by Visitors.	Rice-Water purging Cases discovered by Visitors.	Premonitory Cases passed into Cholera.	New Cases.	Deaths.	Recoveries.
1848							
Dec. 18	..	..	..	..	28	15	10
19	..	..	..	..	28	9	2
20	..	..	..	..	30	9	11
21	..	..	..	..	24	12	6
22	..	..	..	..	42	19	17
23	..	..	..	..	44	19	10
24	..	..	..	..	48	19	14
25	..	..	..	..	53	14	17
26*	..	..	..	..	59	10	20
27	..	..	..	..	78	30	23
28	..	..	..	..	74	32	21
29	..	..	..	..	90	32	28
30	..	..	..	..	73	27	30
31	94	144	35	..	68	29	14
1849							
Jan. 1	131	188	43	..	84	33	27
2	190	177	62	..	121	39	44
3	173	180	66	..	107	34	59
4	272	199	30	..	136	44	42
5	210	236	42	..	125	47	45
6	235	223	49	..	116	46	41
7	169	179	57	..	130	43	53
8	221	209	50	1	104	36	53
9	268	221	56	..	73	35	42
10	236	208	45	..	74	28	43
11	184	178	33	1	40	26	44
12	143	201	37	..	47	20	36
13	129	184	28	2	55	24	37
14	153	118	20	1	35	16	44
15	136	131	12	1	41	12	29
16	127	137	16	2	34	20	38
17	131	102	16	3	35	15	22
18	115	95	9	2	22	12	22
19	134	126	10	2	41	19	19
20	163	131	12	1	30	13	26
21	150	112	14	4	35	8	21
22	143	157	23	..	32	11	21
23	138	135	10	..	42	13	24
24	138	120	12	2	45	16	27
25	128	116	8	1	28	9	21
26	127	88	11	..	49	11	22
27	111	107	19	..	29	13	14
28	76	88	8	..	25	7	18
29	107	92	13	..	40	3	11
30	93	96	10	1	27	13	25
31	64	88	12	..	31	15	23
Feb. 1	58	93	8	..	13	13	28
2	60	59	7	..	23	6	16
3	60	64	8	1	23	8	20
4	57	54	6	..	13	7	14

* Partial house-to-house visitation begun.

Premonitory and Cholera Cases—*continued.*

Date.	PREMONITORY CASES.				CHOLERA.		
	Applicants at Dispensa- ries.	Diarrhœa Cases discovered by Visitors.	Rice-Water purging Cases discovered by Visitors.	Premoni- tory Cases passed into Cholera.	New Cases.	Deaths.	Recoveries.
1849							
Feb. 5	68	63	4	..	28	13	8
6	81	64	14	..	26	11	21
7	72	49	5	..	15	5	9
8	68	62	8	..	14	4	11
9	70	55	8	..	11	5	14
10	65	63	7	..	14	8	10
11	51	45	4	..	11	2	9
12	58	84	5	..	5	4	12
13	49	71	3	..	23	4	8
14	52	62	2	..	7	3	16
15	43	53	3	..	12	3	6
16	28	42	1	1	8	4	15
17	38	35	2	..	8	2	6
18	35	35	2	..	6	2	4
19	41	49	6	..	11	3	10
20	29	33	..	..	11	3	7
21	28	33	..	..	8	3	6
22	20	18	3	..	11	6	9
23	26	5	2	..	11	6	5
24	16	13	..	..	9	6	6
25	22	18	1	..	4	6	6
26	35	10	2	..	8	3	5
27	..	..	..	..	7	1	3
28	..	..	..	..	7	1	1
Mar. 1	..	..	..	..	3	1	..
2	..	..	..	..	4	..	..
3	..	..	..	..	1	..	2
4	..	..	..	..	1	2	2
5	..	..	..	..	..	1	2
6	..	..	..	..	2	1	1
7	..	..	..	..	..	..	1
8	..	..	..	..	..	..	1
9	..	..	..	..	..	..	..
10	..	..	..	..	2	..	..
11	..	..	..	..	..	..	..
12	..	..	..	..	2	..	2
13	..	..	..	..	..	..	..
14	..	..	..	..	1	..	1
15	..	..	..	..	..	..	..
16	..	..	..	..	..	..	1
17	..	..	..	..	..	..	..
18	..	..	..	..	1	..	..
19	..	..	..	..	..	..	..
20	..	..	..	..	..	..	1

TABLE II.

AGGREGATE RETURNS of Premonitory Cases and Cholera in each of the 23 Districts of the City and Barony Parishes, Glasgow, during the continuance of the House-to-House Visitation.

DISTRICTS.	PREMONITORY CASES.					CHOLERA.
	Applicants at Dispensaries.	Diarrhœa Cases Discovered.	Rice-water Purging Cases Discovered.	Total Premonitory Cases Treated.	Premonitory Cases passed into Cholera.	Total New Cases.
<i>City Parish.</i>						
1	199	178	37	414	..	99
2	10	115	6	131	1	45
3	31	157	15	203	1	71
4	142	92	7	241	1	30
5	28	263	29	320	1	72
6	279	56	11	346	..	77
7	809	273	40	1,122	1	116
8	524	155	34	713	3	130
9	264	91	6	361	..	65
10	114	156	36	306	1	35
11	211	112	28	351	1	59
12	135	183	1	319	..	68
13	24	79	6	109	1	62
14	22	191	23	236	1	77
15	8	128	13	149	..	54
16	119	131	48	298	1	67
17	87	376	133	596	2	104
<i>Barony Parish</i>						
1	1,575	888	59	2,522	1	106
2	192	413	183	788	2	160
3	273	468	91	832	3	145
4	395	305	17	717	2	103
5	490	556	54	1,100	1	300
6	188	625	102	915	3	189

TABLE III.

DAILY Proportions of Premonitory Cases and Cholera treated in the
23 Districts of the City and Barony Parishes, Glasgow.

Date.	Total Premoni- tory Cases Treated.	Total Cholera Cases Treated.	Per Centage of Premoni- tory Cases, Cholera being 100.	Date.	Total Premoni- tory Cases Treated.	Total Cholera Cases Treated.	Per Centage of Premoni- tory Cases, Cholera being 100.
1848				1849			
Dec. 31	273	68	401	Jan. 29	212	40	530
1849				30	199	27	700
Jan. 1	362	84	430	31	164	31	529
2	429	121	354	Feb. 1	159	13	1223
3	419	107	391	2	126	23	547
4	501	136	368	3	132	23	573
5	488	125	390	4	117	13	900
6	507	116	437	5	135	28	482
7	405	130	311	6	159	26	611
8	480	104	461	7	126	15	840
9	545	73	746	8	138	14	986
10	489	74	660	9	133	11	1209
11	395	40	987	10	135	14	964
12	381	47	810	11	100	11	909
13	341	55	620	12	147	5	2940
14	291	35	831	13	123	23	534
15	279	41	680	14	116	7	1657
16	280	34	823	15	99	12	825
17	249	35	711	16	71	8	887
18	219	22	995	17	75	8	943
19	270	41	659	18	72	6	1200
20	306	30	1020	19	96	11	872
21	276	35	788	20	62	11	563
22	323	32	1009	21	61	8	762
23	283	42	673	22	41	11	366
24	270	45	600	23	33	11	300
25	252	28	900	24	29	9	322
26	226	49	440	25	41	4	1025
27	237	29	817	26	47	8	587
28	172	25	688				

TABLE IV.
STATISTICS of Premonitory Cases and Cholera in Parkhead Barony
Parish, Glasgow.

Date.	PREMONITORY CASES.				CHOLERA.		
	Applicants at Dispensary	Diarrhoea Cases Discovered. u	Rice-water Purgings Cases Discovered.	Premoni- tory Cases passed into Cholera.	New Cases.	Deaths.	Recoveries.
1848							
December 15	..	..	..	..	2	2	..
22	..	..	..	..	2	1	..
23	..	..	..	..	1	1	..
24	..	..	..	..	..	..	..
25	..	..	..	..	1	..	..
26	..	..	..	..	2	2	..
27	..	..	..	..	4	3	..
28	..	..	..	..	2	2	..
29	..	..	..	..	3	3	..
30	..	..	..	..	2	..	..
31	..	..	..	..	9	2	2
1849							
January 1	..	9	2	..	8	3	..
2	13	13	1	..	3	4	1
3	..	..	..	..	..	..	..
4	42	8	3	..	7	5	..
5	54	24	3	..	7	2	1
6	79	38	2	..	4	1	3
7	10	25	1	..	11	1	1
8	36	17	1	..	6	..	1
9	72	23	..	..	3	2	1
10	70	37	11	..	2	..	3
11	45	18	..	..	1	1	1
12	19	16	1	..	3	1	6
13	22	42	..	..	2	1	7
14	32	13	1	..	..	..	5
15	28	13	1	..	..	1	4
16	33	14	..	..	..	..	2
17	39	21	1	..	..	..	1
18	36	27	..	..	2	..	3
19	59	18	..	..	3	1	1
20	52	17	..	..	1	2	1
21	53	33	2	..	2	1	..
22	41	17	3	..	1	..	..
23	51	23	2	..	3	..	..
24	63	27	3	..	10	1	1
25	43	18	..	..	1	..	..
26	63	12	3	..	4	..	..
27	38	23	..	..	5	1	4
28	33	21	..	..	3	2	1
29	36	18	..	..	4	..	1
30	28	7	..	..	..	..	3
31	22	12	2	..	3	1	4
February 1	18	16	..	..	..	1	7
2	15	10	..	..	1	..	2
3	11	8	1	1	1	..	2
4	14	9	..	..	1	1	..
5	21	12	..	..	2	..	1
6	30	21	2	..	..	2	..
7	24	15	1	..	..	..	..

STATISTICS of Premonitory Cases and Cholera in Parkhead Barony
Parish, Glasgow—*continued.*

Date.	PREMONITORY CASES.				CHOLERA.		
	Applicants at Dispensary	Diarrhoea Cases Discovered	Rice-water Purgings Cases Discovered	Premoni- tory Cases passed into Cholera.	New Cases.	Deaths.	Recoveries.
1849							
Feb. 8	20	13	1	..	..	..	..
9	24	15	2	..	..	..	..
10	26	12	1	..	..	..	..
11	14	6	..	..	..	..	..
12	20	23	1	..	..	..	..
13	27	31	2	..	1	..	1
14	23	27	1	..	..	..	..
15	11	10	..	..	..	..	1
16	7	6	..	..	..	..	..
17	9	7	..	..	..	..	..
18	14	11	1	..	..	..	..
19	13	10	1	..	1	..	1
20	8	4	..	..	..	1	..
21	6	5	..	..	..	..	..
22	5	4	1	..	..	..	..
23	..	..	..	..	..	..	..
24	..	..	..	..	..	..	..
25	3	9	1	..	..	..	..
26	..	..	..	..	..	..	..
27	..	..	..	..	1	..	..
28	..	..	..	..	..	..	..

TABLE V.

STATISTICS of CHOLERA and PREMONITORY CASES in the Borough of
Kingston-on-Hull, 1849.

DATE.	PREMONITORY CASES.							CHOLERA.					
	Dispensary Cases.	Diarrhoea Cases Discovered.	Cases approaching to Cholera Discovered.	Total New Cases.	Under Treatment.	Registrar's Return of Deaths.	Medical Officer's Return of Deaths.	Passed into Cholera.	New Cases.	Registrar's Return of Deaths.	Medical Officer's Return of Deaths.	Recoveries.	Under Treatment.
1849.													
August 31	3	..	..	..	30	..	..	..
Sept. 1	5	..	..	..	40	..	..	..
2	4	..	..	..	25	..	..	..
3	8	..	..	..	59	..	..	..
4	5	..	..	..	46	..	..	..
5	5	..	..	..	71	..	..	..
6	5	..	..	..	92	..	..	..
7	6	..	..	..	81	..	..	..
8	10	..	..	..	75	..	..	..
9	38	..	..	..

Statistics of Cholera and Premonitory Cases—*continued*.

DATE.		PREMONITORY CASES.								CHOLERA.				
		Dispensary Cases.	Diarrhoea Cases Discovered.	Cases approaching to Cholera Discovered.	Total New Cases.	Under Treatment.	Registrar's Return of Deaths.	Medical Officer's Return of Deaths.	Passed into Cholera.	New Cases.	Registrar's Return of Deaths.	Medical Officer's Return of Deaths.	Recoveries.	Under Treatment.
1849.														
Sept.	10	..	..	..	..	..	11	..	..	..	81	..	..	..
"	11	..	..	..	..	..	11	..	..	..	69	..	..	..
"	12	..	..	..	..	..	15	..	..	..	55	..	..	..
"	13	..	..	..	..	..	5	..	..	..	50	..	..	..
"	14	..	..	..	..	..	5	..	..	..	62	..	..	..
"	15	..	..	..	..	..	17	..	..	..	45	..	..	..
"	16	..	..	..	..	..	4	Visitation begun in St. Mary's and Holy Trinity.	{	..	14	..	..	..
"	17	..	40	1	41	40	11			8	40	1	..	..
"	18	..	32	2	34	53	2			7	49	1	..	4
"	19	66	42	3	111	30	5	Visitation begun in Sculcoates.	{	2	32	2	..	2
"	20	..	154	43	197	63	7			20	31	4	11	15
"	21	15	165	18	198	162	2			27	22	5	3	41
"	22	66	166	25	257	216	2	2	..	23	23	3	8	35
"	23	..	247	23	270	686	1	1	1	18	7	8	5	38
"	24	..	252	36	288	649	6	..	..	18	31	8	..	27
"	25	40	268	16	324	619	6	2	2	21	24	12	16	50
"	26	51	252	12	315	535	5	7	2	23	15	8	17	48
"	27	69	216	13	298	633	5	3	2	30	22	17	10	45
"	28	46	213	14	273	621	1	1	..	27	19	10	8	61
"	29	57	210	16	283	668	5	1	2	21	23	10	15	65
"	30	31	155	14	200	569	1	1	..	9	8	7	14	55
October	1	64	197	18	279	595	7	1	1	12	11	6	14	51
"	2	..	191	13	204	569	2	..	1	16	14	5	10	49
"	3	46	150	7	203	504	3	..	4	17	6	4	11	52
"	4	..	161	8	169	468	2	..	..	15	10	5	10	47
"	5	51	160	14	225	580	3	..	..	9	8	9	6	50
"	6	45	180	17	242	570	..	1	..	5	4	..	6	33
"	7	11	117	7	135	506	..	..	..	4	4	3	5	33
"	8	28	127	6	161	500	..	..	..	3	4	..	4	39
"	9	37	134	3	174	551	..	2	..	3	1	1	6	26
"	10	31	120	7	158	512	..	..	2	3	3	3	7	26
"	11	33	92	2	127	468	..	..	..	1	1	1	5	25
"	12	..	79	1	80	325	..	..	..	2	5	..	..	13
"	13	24	80	1	105	323	..	..	..	..	4	..	..	7
"	14	..	48	2	50	243	..	..	..	..	..	..	..	8
"	15	14	58	4	76	280	..	1	..	..	2	..	..	8
"	16	13	65	2	80	276	..	..	..	..	..	..	..	5
"	17	..	52	1	53	239	..	1	..	..	..	..	..	6
"	18	13	55	2	70	239	..	..	..	..	..	..	..	5
"	19	13	58	..	71	229	..	..	..	..	1	..	..	..
"	20	14	49	..	63	224	..	..	..	..	1	..	..	..
"	21	..	33	..	33	136	..	..	..	..	..	..	..	..
"	22	..	31	..	31	38	..	..	..	..	..	..	..	..
"	23	..	16	..	16	..	..	..	..	..	..	..	..	..

TABLE VI.

AGGREGATE DAILY RETURN OF PREMONITORY CASES and CHOLERA in the Five Parochial Districts of Manchester Township, from September 1st to the end of the Epidemic, 1849.

Date.	Cases of Cholera.	Date.	Cases of Cholera.	Date.	Cases of Cholera.	Date.	Cases of Cholera.
Sept. 1	6	Sept. 7	10	Sept. 13	24	Sept. 19	31
" 2	8	" 8	15	" 14	19	" 20	31
" 3	14	" 9		" 15	30	" 21	29
" 4	13	" 10	18	" 16		" 22	32
" 5	28	" 11	21	" 17	26	" 23	16
" 6	17	" 12	21	" 18	30	" 24	23

PREMONITORY CASES.							CHOLERA.			
DATE.	Dispensary Cases.	Diarrhoea Cases Discovered by Visitors.	Approaching to Cholera Discovered by Visitors.	Total New Cases.	Under Treatment.	Passed into Cholera.	New Cases.	Deaths.	Recoveries.	Under Treatment.
1849.										
Sept. 25	..	..	..	..	..	..	23	..	..	..
" 26	..	..	..	..	..	..	31	..	..	..
" 27	..	..	..	..	..	..	34	..	..	..
" 28	..	..	..	..	..	..	17	..	..	..
" 29	..	..	..	..	..	..	17	..	..	..
" 30	..	..	..	..	..	..	21	..	..	..
October 1	..	..	..	..	..	..	..*	..	..	..
" 2	..	158	20	178	260	4	33	13	..*	44
" 3	22	191	28	241	385	7	26	14	10	45
" 4	63	179	20	262	403	4	21	5	6	53
" 5	58	165	34	257	454	3	17	4	8	45
" 6	56	155	20	231	432	2	9	6	11	22
" 7	47	82	14	143	437	1	8	3	3	45
" 8	87	171	9	267	450	1	5	2	10	37
" 9	58	151	9	218	436	..	5	3	8	24
" 10	81	112	13	206	422	..	10	4	3	37
" 11	39	99	8	146	386	..	2	2	5	17
" 12	27	89	12	128	358	..	1	..	7	13
" 13	16	79	1	96	262	1	1	2	..	14
" 14	35	45	6	86	281	..	3	1	1	12
" 15	34	91	5	130	284	..	5	2	2	13
" 16	32	83	11	126	289	1	2	1	..	10
" 17	41	80	5	126	260	3	6	3	..	9
" 18	22	96	8	126	265	..	1	2	..	10
" 19	31	78	2	111	255	..	..	1	2	7
" 20	21	54	2	77	213	..	2	..	..	6
" 21	17	28	7	52	202	..	1	..	..	6
" 22	24	67	4	95	191	..	..	1	4	4
" 23	13	57	5	75	170	..	1	1	..	3
" 24	20	53	2	75	212	..	3	1	..	5
" 25	12	37	3	52	171	..	1	..	..	6
" 26	18	48	1	67	174	..	1	..	..	11
" 27	12	33	3	48	142	..	..	1	2	4
" 28	11	11	..	22	131	..	2	2	1	3
" 29	20	33	4	57	125	..	..	..	..	3
" 30	18	32	3	53	103	..	1	1	..	3
" 31	..	35	1	36	..	..	..	..	..	..
Novem. 1	..	16	1	17	..	..	2	..	..	..
" 2	1	2	..	3	..	..	..	..	1	..
" 3	..	2	..	2	..	..	..	..	..	..

TABLE VII.

DAILY RETURN OF PREMONITORY CASES and CHOLERA in each of the Five Parochial Districts of Manchester Township, during the House-to-House Visitation, 1849.

DATE.	Deansgate.		London-road.		Ancoats.		St. George's.		Market-street.	
	Premontory Cases.	Cholera.	Premontory Cases.	Cholera.	Premontory Cases.	Cholera.	Premontory Cases.	Cholera.	Premontory Cases.	Cholera.
1849.										
October 3	33	8	46	2	55	7	88	7	19	2
" 4	59	8	47	7	46	3	65	2	37	1
" 5	41	5	73	7	56	1	53	1	34	3
" 6	57	3	37	..	50	3	51	1	36	2
" 7	37	3	27	1	33	1	42	1	14	2
" 8	62	1	41	..	41	1	70	1	53	2
" 9	60	3	42	1	36	..	50	1	30	..
" 10	40	4	41	1	35	4	57	..	33	1
" 11	34	2	35	..	35	..	24	..	18	..
" 12	28	..	28	1	28	..	26	..	18	..
" 13	22	..	25	..	11	1	24	..	14	..
" 14	32	..	14	2	23	1	12	..	3	..
" 15	25	2	36	1	21	2	27	..	21	..
" 16	22	..	29	2	34	..	20	..	22	..
" 17	36	..	27	3	15	2	19	1	29	..
" 18	30	1	39	..	17	..	10	..	30	..
" 19	28	..	27	..	15	..	20	..	21	..
" 20	18	1	20	..	9	..	16	1	14	..
" 21	18	..	3	..	10	1	12	..	9	..
" 22	29	..	21	..	15	..	24	..	6	..
" 23	23	..	20	..	11	..	10	..	11	1
" 24	24	1	19	1	12	1	16	..	4	..
" 25	15	..	15	..	4	1	9	..	8	..
" 26	16	..	20	..	7	1	12	..	12	..
" 27	7	..	21	..	11	..	5	..	4	..
" 28	..	2	2	..	13	..	4	..	3	..
" 29	10	..	18	..	9	..	11	..	9	..
" 30	13	..	15	..	5	..	18	1	2	..

TABLE VIII.

STATISTICS of Cholera in Paisley and Charleston: to show the rapid decline of Cholera in a district of a town placed under systematic medical visitation, compared with the course of the disease in other districts where equally effective measures were not taken.

Date.	PAISLEY.			CHARLESTON.			REMARKS.
	New Cases.	Deaths.	Recoveries.	New Cases.	Deaths.	Recoveries.	
1848							
Dec. 26	1	..	..	..	..	..
27	..	1	..	..	..	..
28	..	..	..	..	..	..
29	1	..	..	..	..	..
30	..	..	..	..	..	..
31	1	..	..	..	..	..

STATISTICS of Cholera in Paisley and Charleston, &c.—*continued.*

Date.	PAISLEY.			CHARLESTON.			REMARKS.
	New Cases.	Deaths.	Recoveries.	New Cases.	Deaths.	Recoveries.	
1849							
Jan. 1	..	1	1	..	..	..
2	1	..	..	..	..	..
3	..	1	..	..	..	..
4	4	..	..	..	..	..
5	1	3	1	..	..	..
6	..	1	..	..	..	..
7	..	..	..	..	..	..
8	..	..	..	..	..	..
9	3	..	..	..	..	..
10	1	..	..	..	..	..
11	..	1	1	..	..	..
12	1	..	3	..	..	..
13	1	..	..	..	..	..
14	2	1	..	2	..	..
15	1	1	..	1	1	..	
16	1	..	..	7	3	..	
17	..	..	1	10	1	..	
18	1	1	1	16	3	..	
19	2	2	2	25	8	1	
20	1	..	..	13	6	3	
21	2	2	..	10	9	6	
22	3	1	..	25	13	1	
23	4	2	1	30	9	2	
24	1	..	..	16	10	1	2 visitors at Charleston.
25	1	..	..	25	6	4	Other two visitors added.
26	1	2	1	23	15	5	Other two visitors added.
27	6	4	..	9	4	8	House-to-house visita-
28	5	3	..	7	1	12	tion, with six visitors,
29	1	1	..	5	3	8	continued at Charles-
30	4	4	..	3	3	8	ton from this date.
31	3	1	2	4	3	7	
Feb. 1	2	..	..	6	2	3	
2	7	..	5	..	..	6	
3	1	3	1	2	2	1	
4	1	2	1	2	..	2	
5	3	..	2	1	1	10	
6	4	2	1	3	1	11	
7	..	..	..	4	1	7	
8	2	..	1	..	4	3	
9	4	1	2	1	..	3	
10	2	2	..	2	2	2	
11	1	1	3	..	..	4	
12	1	..	..	1	2	..	
13	4	3	4	..	..	3	
14	2	2	..	..	1	1	
15	4	..	2	..	..	..
16	5	2	..	..	1	..	
17	1	5	2	..	..	..
18	6	..	1	..	..	..
19	11	5	..	1	..	..	Last case at Charleston.
20	2	3	2	..	..	..
21	..	..	..	..	..	..
22	1	2	10	..	..	..
23	..	2	4	..	..	..
24	2	..	2	..	..	..

TABLE IX.—STATISTICS of Premonitory Cases and Cholera in Bristol.

Date.	Dispensary Diarrhoea Cases.	Diarrhoea Cases discovered.	Cases approach- ing to Cholera discovered.	Total new Premonitory Cases.	New Cholera Cases.	Date.	Dispensary Diarrhoea Cases.	Diarrhoea Cases discovered.	Cases approach- ing to Cholera discovered.	Total new Premonitory Cases.	New Cholera Cases.
June 10 }	95	714	40	849	75	Aug. 19	88	14	10	112	12
to 22 }						20	69	17	4	90	11
23	80	57	4	141	..	21	120	18	14	152	4
24	79	45	5	129	3	22	127	14	6	147	8
25	54	35	6	95	2	23	115	9	3	127	9
26	84	57	4	145	..	24	126	16	7	149	8
27	106	48	4	158	..	25	108	7	2	117	10
28	85	71	4	160	1	26	90	16	9	115	6
29	84	64	16	164	..	27	76	3	5	84	6
30	110	61	7	178	..	28	120	18	12	150	8
July 1	100	47	8	155	..	29	125	17	5	147	16
2	66	20	5	91	2	30	99	10	8	117	7
3	86	38	7	121	1	31	82	13	7	102	9
4	77	36	3	116	1	Sept. 1	85	5	5	95	22
5	84	32	7	123	5	2	44	3	8	55	20
6	67	36	10	113	8	3	81	14	3	98	20
7	53	41	6	100	7	4	121	15	6	142	24
8	58	41	5	104	15	5	133	12	9	154	16
9	82	31	5	118	15	6	128	16	16	160	10
10	127	54	15	196	1	7	147	32	20	199	12
11	111	51	14	176	4	8	159	10	13	182	16
12	148	74	11	233	6	9	210	7	6	223	10
13	183	73	14	270	6	10	129	7	13	149	12
14	174	55	6	235	7	11	201	21	11	233	12
15	151	48	16	215	8	12	207	15	10	232	8
16	134	65	15	214	7	13	179	12	6	197	3
17	251	66	23	340	6	14	123	10	6	139	2
18	226	54	7	287	12	15	125	14	1	140	4
19	209	50	9	268	9	16	90	18	4	112	3
20	188	63	13	264	8	17	72	31	8	111	..
21	141	23	5	169	9	18	130	45	4	179	2
22	81	41	8	130	3	19	169	24	2	195	3
23	90	19	2	111	3	20	119	17	6	142	4
24	80	31	1	112	5	21	92	10	1	103	4
25	69	64	1	134	1	22	57	9	2	68	..
26	78	28	2	108	5	23	61	19	1	81	3
27	95	27	2	124	2	24	53	9	1	63	..
28	88	26	2	116	9	25	130	14	8	152	6
29	53	39	1	93	5	26	66	16	5	87	7
30	38	18	..	56	..	27	80	9	5	94	5
31	96	34	3	133	4	28	66	10	1	77	2
Aug. 1	72	27	1	100	8	29	78	9	6	93	6
2	77	37	1	115	..	30	54	18	1	73	5
3	76	17	1	94	2	Oct. 1	33	19	3	55	2
4	62	20	3	85	2	2	59	22	3	84	9
5	50	26	1	78	5	3	19	8	2	29	5
6	32	29	2	63	2	4	10	10	5	25	3
7	73	29	2	104	3	5	68	6	5	79	2
8	30	15	2	47	3	6	48	4	1	53	..
9	59	16	1	76	3	7	29	7	9	45	5
10	39	27	4	70	4	8	6	8	..	14	..
11	60	17	8	85	11	9	39	16	1	56	1
12	39	18	5	62	7	10	37	4	2	43	..
13	46	12	8	66	7	11	19	2	..	21	2
14	117	24	8	149	18	12	..	5	..	5	..
15	107	11	6	124	29	13	..	2	..	2	..
16	82	9	8	99	21	14	..	..	..	..	..
17	118	13	12	143	14	15	..	..	..	..	..
18	66	18	13	97	12						

Duties of the Medical Officers of the Parochial Board of the Parish of Dumfries, acting under the Regulations of the General Board of Health, bearing date November 14th and 24th, 1848; and also under the Regulations of December 9th, 1848, addressed specially to the Parochial Board of Dumfries.

1. Each medical officer is required to report *immediately* to the inspector of the poor, in writing, all streets, lanes, courts, passages, common stairs, houses or rooms, which require cleansing; and in cases where, from any cause, *frequent cleansing* is required, he should specify the fact.

2. Each medical officer is required to report *immediately* to the inspector of the poor, all cases where any drain, ditch, gutter, privy, cesspool, or ashpit, is in such a state as to be injurious to health. He is also required to report *immediately* all collections of filth or manure, or refuse of any kind; and all premises where swine or other animals are kept, if in his opinion injurious to health.

3. Each medical officer is required forthwith to report to the Parochial Board every case of cholera or other epidemic or endemic disease which has come to his knowledge within his district.

4. Each medical officer should report to the Parochial Board if he requires further medical assistance within his district.

5. When cholera or other epidemic, endemic, or contagious disease, appears in any room occupied by one family or more, the medical officer of the district is authorized and required to remove either the patient to hospital, or so many of the occupants of the room to the House of Refuge, as he may consider would, unless removed, tend to prevent the recovery of the patient, or to endanger the spread of the disease. Cases of premonitory diarrhœa may also be sent to the House of Refuge, if the medical officer see fit. No patient approaching to the stage of collapse should on any account be removed; and care should be taken to remove all such as are taken to hospital in the recumbent position, and to keep them properly warmed during the process.

6. In cases of death from cholera or other epidemic, endemic, or contagious disease, the medical officer of the district is authorized to give such directions as may appear to him to be needful, in respect to the care, removal, and the time of interment of the body, for preventing the communication or spread of the disease.

7. Each medical officer is required to make a house-to-house visitation throughout his district once each day at least, and at such other times as he may be directed or find convenient, and to inquire at such visits as to instances of diarrhœa or premonitory symptoms of cholera. It would be very desirable also for the medical officer to give such information during his visits as might tend to the prevention of the disease.

8. The medical officers are also required to carry medicines for the treatment of diarrhœa, premonitory symptoms, and cholera itself, and to administer them on the spot to persons afflicted, as well as to employ all other means which they may think necessary for the recovery of their patients.

Instructions for carrying out a System of House-to-House Visitation, during the prevalence of Cholera within the Bounds of the City Parish of Glasgow.

The object of a house-to-house visitation is to search for and treat immediately all cases of cholera, or its premonitory symptoms, instead of waiting till the patients themselves apply.

1. The carrying out of the system is to be placed in the hands of a general medical superintendent for the whole parish, who shall also act as chairman.

2. There shall be a vice-chairman, with like duties to perform.

3. The existing division of the parish into seventeen districts for medical relief shall be retained, and each district surgeon shall, in addition to his customary duties, act as *district superintendent* within his district.

4. Each district shall be divided into such number of sub-districts as may be necessary for the efficient carrying out of a system of house-to-house visitation.

5. Over each of these sub-districts shall be placed one *visitor*, whose duty shall be as follows:—

(a) It shall be his special duty to make a house-to-house visitation once each day at least throughout his district, or such parts of it as may either be suffering from cholera, or as the district superintendent may point out as being peculiarly liable to epidemic disease.

(b) It shall be his duty, during such visitation, to inquire as to instances of

cines as may be necessary for the relief of these symptoms, and to administer them on the spot to all persons so affected. He should also impress on all persons with whom he may be brought in contact, during such visitations, the danger of neglecting premonitory symptoms, and the necessity for immediate medical relief; and he should urge the propriety of making instant application to such dispensaries as may be open in his district, at any hour of the day or night, by all persons seized with indisposition during the intervals between his visits.

(c) He shall continue the treatment of such cases as he may have met with in his visits, but he shall report immediately to his district superintendent all severe cases of premonitory symptoms or of cholera.

(d) He shall report in writing to his district superintendent, at a daily meeting, all streets, lanes, courts, passages, common stairs, houses, or rooms, which require cleansing or whitewashing; and in cases where, from any cause, *frequent cleansing* is required, he should specify the fact.

(e) He shall, in like manner, report to his district superintendent all cases where any drain, ditch, gutter, privy, cesspool, or ash-pit, is in such a state as to be injurious to health, and all collections of filth or manure, or refuse of any kind, and all premises where swine or other animals are kept, if in his opinion injurious to health.

(f) When cholera appears in any room occupied by one family or more, he shall endeavour to remove the patient to hospital, or so many of the occupants of the room to the House of Refuge as he may consider would, unless removed, tend to prevent the recovery of the patient, or to endanger the spread of the disease. No patient approaching the stage of collapse, should, on any account, be removed; and care should be taken to remove all such as are removed in the recumbent position, and to keep them properly warm during the process. Should the visitor meet with any difficulty in these matters, he should report the fact immediately to his district superintendent, who, as the medical officer of the parochial Board, is authorized and required to see that such removal is effected, provided he consider it necessary for the public safety. Cases of premonitory symptoms occurring in bad localities may also be sent for treatment to the House of Refuge.

(g) In cases of death from cholera the visitor should report the fact to the district superintendent, who is authorized to give such directions as may appear to him to be needful in respect to the care, removal, and the time of interment of the body for preventing the communication or spread of the disease.

6. It will be the duty of each district superintendent to take charge of all severe cases of premonitory symptoms, or of cholera, within his district.

(a) It will be his duty to receive reports of all cases where cleansing is required from the visitors of his district, and to forward the same immediately to the persons charged with cleansing operations, who are bound forthwith to cleanse.

(b) It will be his duty to meet with the visitors of his district at a stated hour each day, to receive their reports as to all cases of premonitory symptoms, in the form of schedules, to be supplied for the purpose, and to advise with the visitors on the general management and concerns of his district.

(c) The whole of the district superintendents shall meet at a stated hour each day, along with their chairman or vice-chairman, to give in the aggregate reports of each district, of all premonitory cases, or cases of cholera, which may have occurred within the preceding twenty-four hours. A general report is then to be made up, and a copy is to be sent the same day to the General Board of Health.

7. Each district superintendent must have his surgery open by day, and six shall be open as dispensaries by night, to supply medicines gratuitously to all necessitous persons affected with the premonitory symptoms of cholera.

8. A supply of blankets, sand, salt, fuel, &c., used in the treatment of cases of cholera, should be kept in some convenient locality in each district, but to be given out solely on the certificate of the district superintendent.

9. The removal of persons from houses to the House of Refuge, while their dwellings are being cleansed and whitewashed, must be rigidly carried out, as being essential to the public safety.

10. Should additional medical assistance be at any time required in any district, the district superintendent should report the fact to the parochial Board.

Glasgow, December 28, 1848.

Similar instructions were printed for the use of the superintendents and visitors of the barony parish.

APPENDIX (B)

TO THE

REPORT OF THE GENERAL BOARD OF HEALTH

ON THE

EPIDEMIC CHOLERA

OF

1848 & 1849.

REPORT BY MR. GRAINGER.

Presented to both Houses of Parliament by Command of Her Majesty.



LONDON:

PRINTED BY W. CLOWES & SONS, STAMFORD STREET,

FOR HER MAJESTY'S STATIONERY OFFICE.

1850.

CONTENTS.

	PAGE		PAGE
SANITARY Report on Epidemic Cholera	3	Bethlem and Hanwell.	72
Cholera preceded by Fever	4	Remarks on Asylums	73
Increase of Zymotic Diseases	5, 6	Epidemics controllable	74
Inter-relations of Epidemics	7	Instance at Berlin	75
Progress of Cholera	8	" of Hamburg	76
First Cases of Cholera	9-11	Model Lodging-houses	77
Total Mortality from Cholera	12	Expense of Cholera	78
Cholera in 1832-33 and 1848-49.	13	Result of Improvements	79-81
Temperature, Electricity, &c.	14	Exemption of Jews	82
Definition of Cholera	15	On predisposing Causes	83-85
Estimate of Attacks	16, 17	Overcrowding	86
On Cholera Hospitals	18	Privy Atmosphere	87
Influence of Age	19	Influence of Animal Effluvia	88, 89
" of Sex	20	Defective Water Supply	90
" of Occupation	21-23	Influence of Foul Water	91, 92
On the Habitat of Cholera	24, 25	Instance of Jacob's Island	93
Cholera among Hop-pickers	26, 27	Contamination of Water	94
Influence of Locality	28, 29	Drunkenness	95
Localities attacked	30, 31	Effects of Bad Food	96
Review of Localities	32, 33	Primary Seat of Cholera	97, 98
River Localities	34	Cholera a Blood Disease	99, 100
Influence of Elevations	35	Analysis of Cholera Blood	101
Cholera attacks in Groups	36	" of Cholera Stools	102
Fever and Cholera Tract	37	Existence of a Premonitory Stage	103
Cholera in Bethnal Green	38	Premonitory Diarrhoea	104, 105
Localization of Cholera	39	Experience of Berlin	106
Influence of Graveyards	40	Experience of Paris	107
Defective Water Supply	41	Characters of Premonitory Diar-	
Cholera in Whitechapel	42	rhoea	108-110
" in Clerkenwell	43	Treatment of Diarrhoea	111-114
" in Islington	44	Neglect of Diarrhoea	115-117
" in Hackney	45	Measures of Boards of Guardians	118-144
" in Westminster	46	House-to-house Visitation	145
" in Shoreditch.	47	Period of Commencement.	146
" in Kensington	48	Extent of House Visitation	147
Description of the "Potteries"	49	Duties of Medical Inspectors	148
Benefit of Sanitary Measures	50	" Visitors	149
Cholera in Lambeth	51, 52	Accuracy of Returns	150
" in Rotherhithe	53	Returns of House Visitation	151, 152
" in Marylebone	54	Visitation of Bethnal Green	153-158
" in Highgate	55	" in Shoreditch	159, 160
" in Hampstead	56	" in Hackney	161
" in Albion Terrace	57	" in Clerkenwell, St.	
Evils of Lodging-houses	58, 59	Luke's, &c.	162
Cellars in St. Marylebone	60, 61	" in Whitechapel.	163
Obstructions to Improvements	62	" in St. George's, Han-	
Cholera among the Troops	63	over-square	164
" in Prisons	64	" in Chelsea, Kensington	165
Millbank Prison	65, 66	Testimony of Medical Visitors	166-168
Houses of Correction	67	Data for House Visitation	169-171
Newgate Prison	68	Lay Visitors	172
Bridewell Prison	69	Testimony of the Poor	173-176
Model Prison	70	Review of House Visitation	177
Cholera in Lunatic Asylums	71	Conclusion.	178-180

LIST OF PLANS.

Plan of Hamburg	To face Title-page.
Cholera Map of Metropolis	
Sections of ditto	
Plan of the parish of St. Leonard, Shoreditch	
Map of the parish of Bethnal Green	
Table 1. Return of Deaths from Cholera	To be placed at the end of Appendix.

APPENDIX B.

SANITARY REPORT ON EPIDEMIC CHOLERA

AS IT PREVAILED IN LONDON IN 1848-49.

MY LORDS AND GENTLEMEN,

I BEG respectfully to present my Report on the late Epidemic, as it prevailed in the metropolis in 1848-49; and in doing so it may be proper to state that the document is essentially a sanitary report, as it would have been foreign to the objects of the General Board to have considered either the pathology or the treatment of cholera.

SECTION I.

Relation between Cholera and other Epidemic Diseases.

IT is the opinion of a large number of medical observers that cholera is nothing else than a form of fever, according to some of the typhoid type, whilst others regard it as of the intermittent form, or allied to ague.* It would be foreign to the objects of this Report to enter into this question; but it is important to notice that, whatever may be the essential nature of cholera, it evidently belongs to the great epidemic class, and has, especially as concerns its habitat and activity, a close relation to typhus, the causes influencing the one affecting the other.

Cholera preceded by Typhus.—It will be shown in the next section that, proportionately as well as absolutely, the cholera of 1848-49 was more severe than that of 1832-33. This decided increase would appear to be in keeping with the steadily increasing prevalence of fever in the metropolis during the three years preceding the arrival of cholera, to which marked attention was called by the Metropolitan Sanitary Commissioners in the month of November, 1847. After showing that the mortality from typhus, in 1846, very greatly preponderated over that of 1845, and that of 1847 even over that of 1846, indicating the unabated or even increased force of epidemic disease, the Commissioners proceed to say,—

“The reasonable inference to be deduced from this fact is, that were cholera to revisit the metropolis at the present time, with the existing predisposition, it would come at a period peculiarly favourable to its extension.”†

* A long list of opinions upon the nature of cholera, as entertained by continental writers, will be found in the following work:—‘Die Cholera,’ von Dr. Fleischer, p. 19. Leipzig, 1848.

† First Report of Metropolitan Sanitary Commissioners, p. 16.

How fatally this prediction has been realised, has been unhappily shown by the experience of the last year. But this increase of typhus is not the only circumstance to be noticed: the whole class of zymotic diseases, which constitute the true gauge of the healthiness or the unhealthiness of a community, has in late years received an immense development, as will appear in the following table, extracted from the summary of the London Returns of Mortality published by the Registrar-General:—

Deaths from Zymotic Diseases.

1838	.	.	.	13,819	1844	.	.	.	11,189
1839	.	.	.	9,613	1845	.	.	.	9,594
1840	.	.	.	8,399	1846	.	.	.	9,596
1841	.	.	.	7,909	1847	.	.	.	14,039
1842	.	.	.	7,729	1848	.	.	.	18,113
1843	.	.	.	10,046					

It will thus be perceived that, excluding the middle year 1843, there has been in the last five, as compared with the first five years, an increase of 31 per cent. The great increase in 1848 is essentially independent of cholera, as the deaths from that affection in 1848 only amounted to 468.

Increase of Diarrhœa.—In examining these returns, it is found that among the principal zymotic diseases the only one which has through the whole eleven years, with two slight exceptions, gone on progressively increasing, is diarrhœa; a point of interest, since, according to my observation, one of the most certain tests of the operation upon the human body of an atmosphere charged, like that of large cities, with putrid animal effluvia, is the prevalence of diarrhœa. The deaths from this disease in London are as follows:—*

1838	.	.	.	393	1844	.	.	.	705
1839	.	.	.	376	1845	.	.	.	841
1840	.	.	.	460	1846	.	.	.	2,152
1841	.	.	.	473	1847	.	.	.	1,976
1842	.	.	.	720	1848	.	.	.	1,913
1843	.	.	.	842					

This table shows that, irrespective of the cholera epidemic, a closely allied class of affections has (after making allowance for the increase of population) experienced in late years an enormous increase, the deaths in 1846 being nearly seven times those in 1838, and nearly five times those of 1841.

Increase of Typhus Fever.—The mortality from typhus has increased as follows:—

1844	.	.	.	.	1,696
1845	.	.	.	.	1,301
1846	.	.	.	.	1,796
1847	.	.	.	.	3,184
1848	.	.	.	.	3,569

In connexion with this general increase of zymotic disease, it is not an unessential fact, that there has been a decided increase in the nine years from 1840–48 in the mortality of childhood, the deaths of persons under 15 years of age being as follows:—

* See Annual Reports of Registrar-General.

1840	.	.	.	21,623	1845	.	.	.	22,633
1841	.	.	.	20,780	1846	.	.	.	22,275
1842	.	.	.	21,266	1847	.	.	.	26,512
1843	.	.	.	23,261	1848	.	.	.	28,378
1844	.	.	.	24,194					

Cholera preceded by Influenza.—It further appears that another epidemic, influenza, as so frequently happened in 1832, was prevalent prior to cholera. Thus, whilst the average deaths from influenza in the autumn quarter of the seven years, 1840–46, were 29·8, they mounted up to 1161 in the same quarter of 1847; and the Registrar-General reports that, taking boys under five years in London, 93 die from all causes out of 1000 annually, whilst “this rate of 93, which prevails in London in ordinary times, was raised by a few weeks’ prevalence of influenza in 1847–48 to 106.” The amount of this mortality may be judged of by the fact, that influenza was in the above period almost as fatal to children as the more terrible epidemic by which it was followed, the deaths from cholera in boys under five years having been, in 1849, 107 in 1000; whilst among aged persons, turned of 75 years, the mortality of cholera was even less than that of influenza.*

The state of health in the metropolis immediately antecedent to the arrival of cholera may be judged of by the following comparative table, showing the mortality of the diseases named, in the quarter ending September 30, in the years 1845–48;† the first undoubted case of cholera in London having occurred on September 22, 1848:—

	1845.	1846.	1847.	1848.
Zymotic diseases	2,437	3,255	4,102	5,162
Small-pox	76	51	320	435
Scarlatina	194	208	316	1,560
Typhus	273	403	895	882
Diarrhœa	449	1,549	1,196	1,048

The same antecedence of fever and influenza was noticed in Russia and Germany. At Hamburg I was informed by the most experienced physicians that the cholera was preceded by a decided increase of the intermittent fever, which it is remarkable seems to play the same part in that and many other continental cities as typhus does in London. Dr. Oppenheim spoke of there having been an immense amount of this intermittent; and in an institution for aged paupers no fewer than 249 cases occurred out of 650 inmates. Scarlet fever, as in London, was likewise very prevalent and severe. Influenza also prevailed, though not to such a degree as to be deemed epidemic. At Berlin intermittent fever, diarrhœa, and dysentery prevailed, especially diarrhœa, previous to the outbreak of cholera. In St. Petersburg, according to Dr. Crawford, there was a very great prevalence of severe influenza,

* Registrar-General's Return, Dec. 15, 1849.

† See Quarterly Returns of Registrar-General, 1849, No. III. p. 39.

and also a decided increase of intermitten fever, prior to the eruption of cholera in June, 1848.

It has usually been observed that, when cholera has actually broken out and with force, the preceding epidemics, and often indeed diseases in general, experience a marked and sometimes abrupt decrease, or they entirely cease. This was the case in the instances just quoted.

As regards London, for some months, during which cholera although continuously present evinced but little intensity—so that, for example, the weekly mortality from October, 1848, to June 30, 1849, was, from this cause, seldom above 50 for the whole metropolis, and never reached 100—the class of zymotic diseases and typhus, so far from falling below the average, was for the most part above it, as will appear from the following table for the first three months of the epidemic :—

Date.	Zymotic.*	Average from 1843-47.	Excess.	Typhus.	Average from 1843-47.	Excess.
1848						
Sept. 30 .	391	257	134	69	40	29
Oct. 7 .	417	270	147	65	50	15
„ 14 .	418	270	148	80	50	30
„ 21 .	348	270	78	65	50	15
„ 28 .	421	270	151	74	50	24
Nov. 4 .	358	270	88	77	50	27
„ 11 .	352	270	82	65	50	15
„ 18 .	332	270	62	70	50	20
„ 25 .	353	270	83	70	50	20
Dec. 2 .	352	270	82	67	50	17
„ 9 .	349	270	79	65	50	15
„ 16 .	331	270	61	68	50	18
„ 23 .	300	270	30	46	50	4 (less)
„ 30 .	338	270	68	71	50	21
Total . .	5060	3767	1293	952	690	262

It follows from these returns that, after subtracting the cholera deaths, there is an excess of the zymotic class, in 14 weeks, of 1293 deaths; whilst the excess of typhus in the same period amounts to 262. But although no effect was produced on other diseases so long as the force of the epidemic was slight, it might be supposed, in accordance with what has been observed in other countries, when cholera acquired its full epidemic force, that, however much it might by its own mortality raise the standard of deaths, the ordinary mortality from other diseases would be diminished. This was indeed the opinion I had formed from many statements made to me that fever and other epidemics had decreased during cholera; and it is probable that this was the case in

* In calculating the excess of zymotic diseases the cholera deaths have been subtracted.

districts where cholera was very destructive. Thus, in Rotherhithe, which suffered more than any other part of London, Mr. Chandler, who had the direction of the parochial medical arrangements, states that cholera swallowed up almost all other diseases, especially those of an inflammatory type, though there was still some typhus. But, with reference to the metropolis collectively, the documents of the Registrar-General, which afford such invaluable data for medical statistics, distinctly prove that, even when the total mortality was swollen enormously by cholera, that of our ordinary diseases of the zymotic class was, in the summer quarter of 1849, only 220 below the average of the four preceding years, and this notwithstanding the heavy increase that had occurred, as shown above, in 1846, 1847, and 1848. Thus, in the quarter ending September 30, 1849, the total deaths from zymotic diseases in London was 17,763; the cholera deaths were 12,847, and those from diarrhoea 2457. Now, if from the latter be deducted 1060 deaths, being the average mortality of diarrhoea in the summer quarter for the four preceding years, the total deaths from choleraic disease will be 14,244 for the quarter; and if this be subtracted from the whole mortality of zymotic diseases, it will leave 3519 for the deaths of that class; whilst the average of the four preceding years was 3739.

Conclusions as to the Epidemics of London.—The facts set forth in the preceding pages disclose a most grave condition of the metropolis as regards epidemic diseases, since it proves that the causes of unhealthiness are so potent in their operation as to allow of scarcely a perceptible diminution in the most fruitful sources of mortality, at a time when, in each of several weeks in succession, an unusual number of the zymotic class was carrying off from a thousand to two thousand victims, which thus went to augment the bills of mortality. The opinion often entertained, that persons who would die of other diseases are those who principally constitute the subjects attacked by cholera, is by these statistics proved to be erroneous, inasmuch as they show that the ordinary diseases still have their ordinary supply. It is indeed true that there was, subsequent to the subsidence of cholera, a considerable diminution in the average weekly mortality; but, when full allowance is made for this, there remains an awful mortality, the main part of which is unquestionably due to the enormous sanitary evils connected with this great metropolis.

It is an important consideration that there is such an intimate relation between the whole class of zymotic diseases—such an inseparable connexion between them as to their predisposing causes, their spread, and their prevention—that what applies to one, applies, speaking generally, to all. If a certain district combines the conditions favourable to the development and extension of low fever, it will assuredly give force to other epidemics—to small-pox, to scarlatina, to cholera; if, on the other hand, by efficient and well-matured sanitary improvements, typhus is diminished or eradicated, the most destructive pestilence may come, but it will acquire little or no footing in a locality thus prepared for resistance. This is not a mere matter of assertion; it will be subsequently shown that, whether we speak of the metropolis generally, of prisons, of lunatic asylums, or of model lodging-houses, the same conditions which either favour or

control the spread of fever, promote or oppose the ravages of cholera. It is not, therefore, because by the Divine blessing cholera has disappeared, that the sanitary proceedings undertaken under the alarm it inspired should cease. And yet, according to the reports of the medical inspectors, in many of the most densely populated districts, the inspectors of nuisances have been dismissed; the cleansing operations have been relaxed; and there is too much reason to apprehend that the courts and alleys will lapse back again into their accustomed filth; that privies and cesspools will again be allowed to overflow; that houses, proved by the evidence of medical officers, inspectors, and local authorities to be unfit for human habitations, "will long continue to remain," to quote the words of the Clerkenwell guardians, "pest-houses, spreading disease around;" and that, in the midst of all these tolerated and accumulated evils, the industrious classes will continue, as heretofore, to be decimated by fever, or, should it again break out, by cholera.

SECTION II.

On the Progress of Cholera in London.

Deficiency of Statistical Details.—Fully to have elucidated this subject, much more ample and detailed information would be necessary than it has been possible to procure. It would, for instance, have been requisite that the number of attacks, whether of the developed disease or of choleraic diarrhœa, and the relative mortality, should be known; the precise seat of these attacks, as to streets, and even courts and alleys, and the sanitary condition of these places; the proportion of attacks to the population in each such case; the age, sex, occupation, and mode of life of the persons attacked. Details like these, applying to a population of two millions and a quarter, would, it is obvious, under any circumstances, be most difficult of attainment; in fact, nothing short of a complete sanitary system could give such statistics. As it was, cholera came upon the metropolis when for the most part as unprepared with any systematic arrangements, as in 1832. Among other evils which flowed from this state of things, was the impossibility of obtaining accurate and complete reports of the daily progress of the disease; and yet this information was indispensable to the General Board of Health, the body intrusted with directing the various measures demanded on the occurrence of the epidemic, among which the amount of medical aid required was of course the most essential. Repeated attempts were made to procure from the local authorities daily returns showing the fresh attacks, but in vain.

A most serious impediment to the application of prompt measures of relief thus arose; and it was not till the Registrar-General, after considerable difficulty, and when the disease had made great progress, succeeded in obtaining a daily return of the deaths in each sub-registration district, that any reliable information was procured. If, unhappily, there should be any recurrence of the disease, some efficient plan ought to be devised for securing from every part of the metropolis regular and accurate daily returns, not only of the mortality, but especially of new cases both of cholera and diarrhœa: if such informa-

tion were not provided, it is to be apprehended that a serious sacrifice of life would be the result.

Sources of Information available.—In the absence of more precise data, the sources of information of which I have principally availed myself are as follows:—

1. The reports of the several medical inspectors who superintended the house-visitation.
2. The evidence of the medical officers of the metropolitan unions and parishes.
3. The mortality returns of the Registrar-General.*

Duration of the Epidemic.—The first undoubted case of cholera in London took place on September 22nd, 1848, at Horsleydown, Southwark; this case proved fatal in 11 hours: the last death recorded appears in the return of the Registrar-General, December 22nd, 1849: the whole of the epidemic having thus occupied a period of 15 calendar months.

There is little or no doubt, however, that some isolated cases of true Asiatic cholera occurred earlier than reported; but they were returned as English cholera. Several such cases are reported by Dr. Gavin to have occurred unquestionably in Bethnal-green, namely, 6 in July, 4 in August, and 2 in September, 1848. Three similar cases occurred also in Southwark prior to September 16, 1848.

First Cases of Cholera.—The history of the first cases of cholera occurring in any new locality is obviously a point of much interest in connexion with the question of contagion. The Board of Health was therefore desirous that the first attacks in London should be investigated; and the inquiry was intrusted to Dr. Parkes, who had had considerable experience of cholera in India. The following particulars of these cases are extracted from the Report of the General Board on Quarantine. It may be premised that the cases of cholera in London were among the first that appeared in Great Britain, being only a few days subsequent to the first case reported in the port of Hull, on board a vessel which had come direct from Hamburg. The first case, as above stated, occurred on September 22nd, 1848.

“From this period to the 10th October (twelve days), 28 cases occurred. An analysis of these cases, from Dr. Parkes’ Report, gives the following results:—

- “1. These 28 cases occurred in ten different localities.
- “2. These localities were not near each other, but were situated at remote distances.

* As these returns do not altogether correspond to the more commonly known parochial divisions, it is proper to explain that, for the purpose of registering births, deaths, and marriages, the metropolis is first of all divided into 36 “superintendent registrars districts,” and then again into 135 sub-registration districts. These latter or “sub-districts,” will be found, when properly grouped together, to correspond, with some trifling exceptions, to the several unions and parishes; and in this way the respective mortality in these more familiar divisions will appear. (See the tinted map of the metropolis appended to this Report.)

"3. In not a single instance, as far as could be traced, had the first person attacked in one locality been in contact or proximity with a person previously sick in another locality, and in some instances such contact or proximity was impossible.

"Thus the first case occurred (September 22nd) at Horsleydown; eight days afterwards (September 30th) two more cases occurred simultaneously, the one at Lambeth and the other at Chelsea; on the following day (October 1st) another case occurred in the City, in Harp-court, Fleet-street; the next day (October 2nd) a case occurred in the *Justitia Hulk*, at Woolwich; and three days afterwards (October 5th) the disease broke out simultaneously in the *Dreadnought* (hospital-ship) off Greenwich, and in Spitalfields.

"Diligent search was made to trace communication, direct or indirect, between the persons successively attacked in these several districts, but no evidence of it could be discovered; nor could such communication have taken place among persons having no kind of connexion or acquaintance with each other without an extraordinary series of accidents. But in two instances, if not in more, it is absolutely certain that no such accidental encounter could have happened. A convict was seized in the *Justitia Hulk*, at Woolwich, on the 2nd of October; but the convicts at Woolwich, though they work in the Dockyard, are watched by armed soldiers, and are allowed no intercourse whatever with other persons, while the *Justitia* herself lies about three miles below Greenwich, far apart from any other vessel except the convict hospital-ship, no merchant-vessel anchoring at this point of the river; so that, if cholera had been raging in Woolwich and had been prevailing in the vessels in the Thames above Woolwich, the origin of cholera in the *Justitia* would not have been attributable to contagion. But there was no cholera in Woolwich or in the merchant-vessels in the Thames, and the only cases in London which were anterior in point of time to this in Woolwich were those at Horsleydown, seven or eight miles distant; Lambeth, twelve or thirteen miles distant; Chelsea, thirteen or fourteen miles distant; and Fleet-street, ten or twelve miles distant. The occurrence of contact or proximity between these individuals and the convict at Woolwich may therefore be said to have been absolutely impossible.

"So again in the *Dreadnought* hospital-ship, a man was attacked on the 5th October. The *Dreadnought*, as has been just stated, lies off Greenwich, three or four miles distant from the *Justitia*, with which it holds no kind of communication; it is also many miles distant from Horsleydown, Lambeth, Chelsea, and Fleet-street. This man had been on board the hospital-ship under treatment for another complaint a month before his seizure; he could not therefore have been in contact or proximity with any of the 9 cases which occurred previous to his attack; and no sailor arriving from any infected place had been admitted with any complaint whatever for some considerable time. 'By permission of the officers,' says Dr. Parkes, 'I took the opportunity of inspecting the admission book, and learned that no sailor arriving in a ship from any port in or near which cholera was or had been prevalent had been admitted for any complaint whatever for a considerable time. The disease, therefore, could not have been brought on board by the clothes of some non-infected individual arriving from an infected ship.'

"The result of this observation is that cholera, at least in these first 28 cases, did not arise and spread from contact or proximity with persons previously infected: and the greater weight must attach to this conclusion because it is founded on more trustworthy evidence than is commonly attainable on these subjects, inasmuch as, with a full knowledge of the importance of the inquiry, the most careful investigation into each case was immediately made on the spot.

"A similar examination of the circumstances connected with the outbreak of cholera in the several towns of England in which it successively appeared, as far as the analysis has been completed, gives a like result.

"The manner in which the disease spread through particular establishments in the metropolis, wherever an opportunity has been afforded of making a correct observation of facts, fully confirms the conclusion derived from this general experience. For example, from the 15th to the 22nd of October, 1848, 15 cases of cholera occurred among the convicts in the Millbank Prison. With reference to these cases Dr. Baly, the medical superintendent of the prison, in his official Report, observes:—

"It has seemed to me not uninteresting to inquire whether there were any facts to justify a suspicion that cholera had been introduced into the prison, and spread through it, by contagion. The man first attacked, John Fisher, had been between five and six months here. He occupied a separate cell in G ward, pentagon 6, and had no communication with any persons except the officer of his ward, the supervisor of his pentagon, the schoolmasters, the chaplains, and occasionally other prisoners of his own ward. None of the officers mentioned had been in any district where cholera prevailed. No prisoners had been received into the prison from Woolwich, and no stores from any places known to be infected.

"It is then extremely difficult to believe that this prisoner can have taken the disease, even indirectly, from any person already affected with it. The facts are equally opposed to the notion that it was communicated from him to the other prisoners subsequently attacked. No prisoner in the same ward, or even on the same floor of the pentagon, in which Fisher was, has been attacked with cholera; and the successive cases have occurred, for the most part, in the most distant and separate parts of the building.

"In one instance two men occupying contiguous rooms, James Yeomans and Duncan Turner, were attacked, the one two days after the other; but this was in all probability an accidental circumstance, for the two rooms did not communicate directly with each other, and these two men had no direct intercourse; but there were several other prisoners in the cells with them, none of whom were attacked.

"In the infirmary, where there was the most chance of infection occurring—since, although a special room is set apart for the cholera patients, this room communicates with the other parts of the infirmary—none of the patients admitted for other diseases have been attacked with cholera; and, excepting the instances above referred to, the men attacked with cholera in the pentagons have all been in different wards, and where two cases have occurred in one pentagon this has been even on different floors. In each of these cases, it appears to me, there would be the same difficulty in accounting for the production of the disease by contagion, as in the case of Fisher. After an unbiassed consideration of all the facts, therefore, I can but conclude that cholera has not shown itself to have a contagious character in this prison."

"From the preceding evidence, the conclusion is inevitable that the first cases of cholera in London, whether occurring in the metropolis generally or in particular establishments, did not originate and spread by contact or proximity of the infected with the uninfected. This observation is in accordance with the facts recorded with reference to plague by those who have had opportunities of observing the progress of this disease in the countries and cities in which it prevails as an epidemic, who state that on its outbreak the first cases are in like manner isolated; that they appear in localities remote from each other; and that there is no traceable communication between the persons first attacked."

Two Periods of the Epidemic.—The weekly returns show that,

although there was only what can be called one epidemic, since within the period specified there was no single week in which the metropolis was entirely free from cholera deaths, yet it was evidently divided into two distinct and well-marked periods, not only in London, but also, with some considerable differences as to dates, in other parts of England. In the metropolis, the first period may be considered as having extended from September 22, 1848, to the end of March, 1849, during which the mortality amounted to 988. In the month of April the deaths sank from 5 and 2 in the first and second weeks to 1 in each of the two last weeks. In four weeks in May the deaths were respectively 4, 3, 1, and 5. The second, and much more fatal period, evidently commenced in June, when in the first week the deaths rose to 9, increased in the last week to 124, and then went on rapidly and uninterruptedly increasing till the acme was obtained in the week ending September 8, when the deaths from cholera were 2026, and from diarrhœa 272; from this time the disease declined, and ultimately ceased at the period stated above, December 22, 1849. The highest weekly mortality of the first period was 94, occurring in the week ending January 13, 1849; and the highest weekly mortality of the second period was 2026, independently of 272 deaths from diarrhœa and 17 from dysentery, taking place in the week ending September 8, 1849.

Total Mortality from Cholera.—The total mortality from cholera for the 62 weeks ending November 24, 1849, was 14,601. The total mortality in the same time from diarrhœa was 3857, which, deducting the average mortality from this disease for a similar period during the 10 years 1838-47 (namely, 1063), leaves 2794 deaths in excess, a large proportion of which must be attributed to the epidemic influence of cholera. The total mortality from dysentery amounted to 464 in the period in question, which is an excess of 278 above the average, this being about 186. The mortality in London from the late epidemic may then be set down as follows:—

Deaths from cholera	.	.	.	.	.	.	.	.	14,601
Excess of deaths from diarrhœa	.	.	.	.	.	.	.	.	2,794
Excess of deaths from dysentery	.	.	.	.	.	.	.	.	278
Total deaths									17,673

The estimated population of the metropolis in 1849 was 2,206,076; and it will thus appear that 1 person died of cholera in every 151 of the inhabitants, or '66 per cent., independently of the deaths from diarrhœa and dysentery.

Total Mortality in 1832-33.—It is important to show the relation between the late epidemic and that of 1832-33. The latter commenced in London on February 16th, 1832, and finally ended on September 7th, 1833; there being, however, two distinct periods, or rather two epidemics, since there was a complete interval of eight months; the first attack lasting from February 7th to November 30th, 1832; and the second from August 1st to September 7th, 1833. The progress of the disease, as the deaths and cases were reported to the Privy Council, is shown by the following table:—

TABLE showing PROGRESS of CHOLERA during the years 1832 and 1833.

	Attacks.	Deaths.		Attacks.	Deaths.
1832.			Brought forward . .	3291	1850
Week ending Feb. 23	14	14	Week ending July 20	787	394
" March 2	104	57	" " 27	1,064	445
" " 9	277	139	" Aug. 3	787	299
" " 16	381	195	" " 10	501	190
" " 23	389	225	" " 17	637	234
" " 30	396	279	" " 24	783	325
" April 6	364	198	" " 30	795	350
" " 13	170	94	" Sept. 7	567	309
" " 20	87	34	" " 14	291	144
" " 27	50	27	" " 21	301	147
" May 4	27	20	" " 28	96	43
" " 11	34	12	" Oct. 5	162	81
" " 18	18	16	" " 12	285	150
" " 25	12	7	" " 19	78	37
" June 1	28	17	" " 26	89	61
" " 8	27	13	" Nov. 2	84	48
" " 15	20	15	From Nov. 2 to Nov. 30	26	13
" " 22	57	34			
" " 29	179	116	Total . . .	10,624	5,120
" July 6	162	99	Omitted . . .	396	155
" " 13	495	239	1833.		
Carried forward . .	3291	1850	From Aug. 1 to Sept. 7	3,124	1,454
			Grand total . .	14,144	6,729

Proportion of deaths to cases, 47 per cent.

In 1832 the population of London was 1,681,641, so that, in the epidemic of 1832-33, one person died in every 255 of the inhabitants, or 4-7ths less than in 1849. The highest weekly mortality in 1832 was in the week ending July 27th, when the deaths were 445; whilst, as it will immediately appear, the highest weekly mortality in 1849 was in the week ending September 8th, when the deaths amounted to 2026.

Weekly Mortality.—In the Appendix will be found a table showing the weekly mortality in each sub-district of the metropolis for a period of 60 weeks, as published by the Registrar-General, together with the population. (See Appendix, No. 1.)

Monthly Mortality in 1848-49.—The following table shows the monthly mortality of cholera for 62 weeks in 1848-49 (including diarrhœa), as given by the Registrar-General:—

1848.	Cholera.	Diarrhœa.	1849.	Cholera.	Diarrhœa.
September, last two weeks . .	11	90	January	262	82
October	122	145	February	181	109
November	215	117	March	73	92
December	131	113	April	11	56
			May	13	65
			June	246	119
			July	1,952	490
			August	4,251	780
			September	6,644	1,187
			October	464	319
			November	27	93
			Total . . .	14,601	3,857

Observations on Temperature, Electrical State of the Air, &c.—If the weekly progress of the epidemic were compared with the mean weekly temperature, it would appear, that, although there is not an uniform relation between the elevation of the thermometer and the progress of cholera, in London, as in other parts of Europe, the main force of the disease corresponded with the three hot months, July, August, and September. It is also worthy of observation, as will appear from the following extract, which refers to what may be called the cholera quarter, that when the epidemic was at its acme, from August 18th to September 15th, the temperature was without exception high, with a thick and stagnant atmosphere.

“The mean daily temperatures of the air from July 1st to July 17th were above their average values; the mean excess was $3^{\circ}2$. From July 18th to August 5th they were below their average values; the mean deficiency was $2^{\circ}2$. From August 6th to August 12th the temperature was high; its mean daily excess was $6^{\circ}0$. From August 13th to August 19th the mean deficiency was $1^{\circ}9$. From August 20th to September 15th the temperature was high; its mean excess was 4° . This period was distinguished by a thick, stagnant atmosphere; and the air was for the most part very close and oppressive. The temperature was $3^{\circ}3$ below its average from September 11th to September 21st; and it was $5^{\circ}5$ in excess from September 22nd to the end of the quarter, namely, the 30th.*

There were considerable variations in the temperature during the quarter, amounting in the whole of England to 56° , the extremes being 86° and 30° . The highest temperature in London for the three months was 87° ; the lowest at the Observatory, Greenwich, $39^{\circ}5$.

The horizontal movement of the air during the months of August and September, was about one-half the usual amount; this observation applies to an elevation at Greenwich 200 feet above the level of the sea. At a less elevation, the movement was much less.

“On many days when a strong breeze was blowing at the top of the Observatory and over Blackheath, there was not the slightest motion in the air near the banks of the Thames; and this remarkable calm continued for some days together, particularly from August 19th to 24th; on the 29th; from September 1st to 10th; and after September 15th. On September 11th and 12th the whole mass of air at all places was in motion; after the 15th of September, to the end of the quarter, the air was in very little motion.”

Disturbance of the Electric and Magnetic Forces.—Dr. Crawford mentions, in his valuable Report on the Cholera, as it prevailed at St. Petersburg in 1848, that the electric force was disturbed, so that machines could not be charged, and thus to a great extent lost their power.

* Remarks on the Weather during the Quarter ending September 30, 1849, by James Glaisher, Esq., F.R.S., of the Royal Observatory, Greenwich. (See Quarterly Return of Registrar-General, p. 40.)

It was also said that the magnetic force was diminished. These statements, in the midst of the profound obscurity in which the efficient cause of cholera is involved, attracted considerable attention; but my own inquiries have not confirmed them. Thus at Hamburg, express observations were made, among others, by Dr. Alexander of Altona, which showed that magnets had lost none of their power. The experience at Berlin was of the same character. Mr. Glaisher's remarks on these points are as follows:—

“The summer had been warm and dry, without great heat; thunderstorms have been very frequent during the quarter; the air has been for the most part unusually dry. The magnets have been seldom disturbed during the quarter; and the amount of electricity, though less than usual, seems to have been so in consequence of the less amount of humidity of the air.”

Estimate of the Number of Attacks.—For the reasons already assigned, it is impossible to attempt any accurate calculation of the number of persons actually attacked by the late epidemic in London. Indeed, even if the necessary returns had been furnished, there are other difficulties which would have prevented, in the present state of knowledge, any correct estimate being formed.

It is, for example, most difficult to assign any limits, which would be universally acceded to by medical practitioners, between cholera and diarrhœa; and the fact is, that the latter runs so insensibly into the former, in a large number of cases, as to defy rigid separation. To which category, for instance, are those numerous cases of rice-water purging, without collapse, to be referred—are they cases of cholera or of diarrhœa? If this point were decided as it ought to be, in the former sense, then there would arise another question concerning the true nature of that much more numerous class of attacks, in which the evacuations, without having the special characteristic first named, are of a thin, pale, and serous character; are often accompanied with vomiting, coldness, cramps; and, still more, exhibit occasionally the same consecutive fever as complete cholera. The consequence of all this was, that during the last, as in the preceding epidemic of 1832, there was the greatest discrepancy of opinion among medical men in all parts of London; some applying the term cholera to attacks which others called diarrhœa; a circumstance not only liable to affect most importantly the point under consideration, but, as must be obvious, the whole statistics of the disease, and especially all that concerns the relative mortality and the effects of treatment. A large part of this incertitude has arisen from the circumstance of so little attention having been formerly paid to the diarrhœa, which so extensively prevails during an attack of cholera; for, so long as the true nature of this is allowed to remain in doubt, no true limits can be assigned to the epidemic.

Definition of the Board of Health.—In all their proceedings and documents, the General Board of Health reported those only to be cases of cholera in which there was actual collapse; that is to say, where the pulse was either extremely weak or entirely lost; where there was

great prostration of strength; shrunken features; coldness of the surface; a marked diminution or total suppression of the urinary secretion; and the characteristic rice-water evacuations. Although pathologically all cases of choleraic diarrhœa, and even many other forms of disturbance both of the alimentary canal and other organs, are, as it will subsequently be attempted to be shown, a part and parcel of the epidemic, yet, as some arbitrary limit must, until medical statistics are in a very different state to what they are at present, be assumed, this definition of cholera, resting on a marked and easily recognized stage of the disease, appears to be sufficient for all practical purposes, and would, if generally adopted, tend to introduce much more precision into published accounts of cases and the results of treatment.

The experience of other European countries, although it is like that of this country imperfect, will throw considerable light on the number of attacks as compared with the deaths; a few examples will therefore be useful.

It is stated by M. Tardieu, that in the first four months of the epidemic of 1832 there were in 39 départements 120,000 attacks and 60,000 or 50 per cent. of deaths; in one département there were 12,393 cases and 5938 or 47 per cent. deaths; in 18 days after the appearance of cholera in Paris, in 1832, from 12,000 to 13,000 attacks were reported and 7000 deaths. The above instances occurred towards the commencement of the epidemic, when the mortality is usually highest.*

Dr. Müller, the Hanoverian Commissioner, who visited St. Petersburg, states that from June 12th to July 22nd, 1848, 20,055 persons were attacked, of whom 11,217 died, 5191 recovered, and 3647 remained under treatment when the report was written.† Now, if of these last it is estimated that half died and half recovered, it would appear that out of the whole number attacked no less than 13,040, or 65 per cent., died. Dr. Müller, in another report, states that in one month at St. Petersburg 5 persons out of every 100 were attacked, and that from $2\frac{1}{2}$ to 3 per cent. (60 per cent.) died.

From July 27th, 1848, when the first case occurred at Berlin, up to November 7th, 1848, when the epidemic had nearly ended, the number of attacks reported was 2370; of deaths, 1523; of recoveries, 690; and of those still under treatment, 157; this will give 1601 deaths or 67·5 per cent. of the whole attacked.

The following statistics are extracted from the official Report of Dr. Buch, transmitted to the General Board of Health, showing the results of the epidemic of 1848 at Hamburg.

Total inhabitants	182,435
Total attacks of cholera	3,687
Deaths	1,765
Recoveries	1,922
Proportion of attacks to inhabitants, 1 in 49.	
Do. of deaths to do., 1 in 103.	
Percentage of deaths to attacks, 47·8.	

* *Cholera Epidémique*, p. 77.

† *Einige Bemerkungen über die Asiatische Cholera*, p. 26.

This is a much more favourable result than that of either of the two other cities, the deaths amounting only to 47·8 per cent. of the attacks.

Experience of London.—As regards London, owing to the want of returns already noticed, it is impossible to give the proportion of deaths to the attacks for the whole epidemic. Mr. Liddle has given a return from a part of the medical officers of Islington and Whitechapel, consisting of 569 cases of developed cholera, that is in the state of the collapse, of which number 296, or 52 per cent., were fatal. In 438 cases occurring in Whitechapel Union, 208, or 45·2 per cent., were fatal. Mr. Liddle says,—

“From my own experience I can state that upwards of one-half the cases die when seen for the first time in collapse: at the commencement of the epidemic nearly all die; towards the close the majority recover.”*

Dr. Gavin has sent me a statement of 993 cases attended by some of the medical officers of Shoreditch and Bethnal-green, of which 310, or 31·2 per cent., were fatal. In these cases there were serous purging, vomiting, and cramps; “but it is not to be inferred they were all in the stage of collapse.” One of the surgeons of Chelsea parish had 71 cases of cholera, out of which 45, or 63·5 per cent., were fatal.

Soldiers.—Among the troops quartered in London, there were 69 attacks and 27 deaths, or 39·1 per cent.

Workhouses.—As the Returns showing the progress of the epidemic have not yet been received, only a few instances of the relative mortality among the inmates can be given. In St. Luke’s workhouse there were 36 attacks of cholera and 24 deaths, or 66·6 per cent. In the workhouse of Shoreditch the cases were 109 and the deaths 61, or 55·9 per cent. In Hackney workhouse 27 cases and 17 deaths, or 62·9 per cent. In St. Giles’s 18 attacks and 15 deaths, or 83·3 per cent.

Mortality in cases admitted into Hospitals.—Into St. Bartholomew’s Hospital there were admitted 478 cases of confirmed cholera, of whom 199, or 41·8 per cent., were fatal. At St. Thomas’s Hospital 147 cases of developed cholera were admitted, of which 66, or 44·8, were fatal. At the London Hospital 102 cases, of which 40, or 39 per cent., were fatal.† At St. George’s Hospital 20 cases were admitted, of which 11, or 55 per cent., were fatal. At the Middlesex Hospital 58 cases, and of these 29, or 50 per cent., were fatal. In King’s College Hospital 123

* This remark does not apply to complete collapse, which is as fatal at the end as in the commencement of the epidemic.

† The London Hospital, according to a statement furnished by Mr. Burch, the resident medical officer, was the first among the metropolitan medical institutions to open its doors for the admission of cholera cases, for which two wards were appropriated. The ordinary patients and attendants amounted to about 405, and among them not one case of cholera occurred: all the diarrhoeal cases arising in the hospital were speedily relieved by the ordinary treatment.

cholera patients were admitted, of whom 40 died. In the Lunatic Asylums of London 267 attacks are reported, and 166 deaths, or 62·1 per cent. In the prisons 158 cases and 62 deaths (39 per cent.) are recorded.

In the present category may be included the cases admitted from the Union into the infirmary of St. Giles's workhouse: the number was 139, and the deaths 106, or 76·2 per cent.*

Results.—As far as these limited data extend it will be found that the relative mortality was as follows:—

* The General Board of Health, resting on extensive inquiries as to the expediency of cholera hospitals, discouraged their use, except in cases where, owing to extreme destitution or other circumstances, the persons attacked could not receive proper attention at home. The general experience of the late epidemic has confirmed the correctness of these views, and has shown that the effect of removing patients in the developed stage of the disease is, on the whole, unfavourable. Thus I found that at Hamburg, whilst 1075 deaths took place in the town out of 2002 attacked, or 53·1 per cent., in the hospitals 214 died out of 319 cases admitted, or 67 per cent. At Berlin, up to November 25, 1848, 1837 cases had occurred in the city, of which 1201, or 67·2 per cent., died; in the hospitals the cases amounted to 569, and the deaths to 343, or only 60 per cent. These figures, however, do not give the true result, as those deaths were deducted in the hospital returns, when the patients were found to be dead on their arrival. At one of these hospitals no fewer than 17 persons died in the transit. The experience of the London hospitals, as shown above, is much more favourable, the percentage of deaths to attacks being, if St. Giles's Infirmary (a pauper establishment) is excluded, 41·5; whilst the mortality in 2071 attacks among the general population amounts to 859, or 41·4 per cent. If St. Giles's Infirmary be included with the hospitals, the mortality in those institutions is raised to 46.

Although in this metropolis the results are so satisfactory, the general principle of treating all cases at home should be observed. The mere transport of a patient may turn the scale; many instances occurred, for example, where persons who, on leaving home, had a pulse and were warm, were found to be pulseless and cold, or even, as stated above, dead, on their arrival at the hospital. Patients labouring under collapse are, in fact, in a state resembling that caused by large losses of blood; and in that condition it is well known that even trifling movements of the body may bring on a fatal syncope.

The general principle being recognised, it is yet evident that there must be, in the more destitute districts, many instances where none of the necessary appliances can be obtained, and where consequently some kind of hospital accommodation would be necessary in the event of another epidemic. The great difficulty which was experienced in the last year in providing such accommodation renders it essential to inquire how this want can best be met. Having carefully considered all the facts connected with the admission of cholera cases into common hospitals, and having consulted the medical officers of those institutions, I feel myself justified in stating, that, when suitable precautions are in all respects observed, there is no danger attending the practice. Distinct wards should be set apart for the reception of cholera cases, and, if possible, they should be in a detached building.

An ample staff of nurses should be provided, not only for efficient attendance night and day on the patients, but likewise to allow of frequent relays. The experience of the late epidemic has induced me to believe that meritorious and zealous nurses have sacrificed their lives, in some institutions, by over exertion. Considering the nature of the duty, I conceive that no one nurse ought to remain more than 8 hours out of the 24 in actual attendance on the sick; that there should, therefore, be in all cholera wards 3 relays per diem; and that, in the intervals of duty, the attendants should be encouraged to remain in the most healthy atmosphere attainable. This would necessitate extra expense, but society has no right to impose on persons, having for the most part no real choice, duties which are known to endanger life, so long as the question is, like this, merely a pecuniary one.

	Cases.	Deaths.	Percentage of Deaths.
Among the general population	2,071	859	41·4
Among the troops	69	27	39·1
Inmates of workhouses	190	117	61·5
Persons admitted into hospitals	1067	491	46·
Lunatic asylums	267	166	62·1
Prisons	158	62	39·
Mean of all these cases	3,822	1,722	45·

The number of cases above recorded is too limited to justify either any general conclusion as to the mortality in proportion to the attacks, or to institute a comparison between the different classes of persons in hospitals, workhouses, &c. From various sources of information, I believe, however, it may be safely stated that in Western Europe, in fully developed cases, that is, when there is collapse, great diminution or complete suppression of urine, with the pulse extremely weak or lost, the mortality will amount, including the whole epidemic, from 45 to 50 per cent. of the attacks. Assuming this as a mean, and that there were 14,601 deaths, it would appear that the total number of developed cases of cholera in London amounted to about 30,000.

Age.—The number of attacks and the mortality of cholera are known to vary in a remarkable degree according to age.

In the Appendix will be found some tables, which have been carefully prepared by Mr. H. C. Edwards, and which present at one view the influence of age, sex, and of occupation generally, on the progress and mortality of the epidemic. (See Appendix Nos. 2 and 3.)

These tables, as they relate only to the mortality, and not to the whole of the attacks of choleraic disease, are so far imperfect; but notwithstanding this deficiency, which, for reasons already stated, was unavoidable, they still afford data for several important conclusions. Taking the standard of the population for the year 1841, and dividing the deaths into quinquennial periods, it will be seen that the liability to fatal attacks increases in a most marked degree after the age of 50; and this, though with variations, in both sexes. In the first five years the proportional mortality is high, being in the male sex 1·0, and in the female ·8 per cent. of the living; from the age of 5 to 45 in the male sex the mortality keeps below that of the first quinquennial period, the deaths being fewest from 5 to 10 years of age. In the female sex the fatal attacks are also fewest from 5 to 10 years; at 30 to 35 years the mortality is as high as in the first five years of life, and at 40 exceeds it. From the age of 65 in both sexes the relative mortality is much increased; the most fatal period being that from 80 to 85, when it amounts in the male to 5·2, and in the female sex to 6·6 of the living. A considerable part of the increased mortality in advanced age depends on the reduction of the vital powers, and on the greater difficulty then experienced in controlling the progress of the disease, so that out of a given number of attacks

there would be more fatal results. If the absolute number of deaths be regarded, it will be found that the mortality has fallen severely on the most valuable part of life, speaking economically, namely from 20 to 45 years, the deaths at those ages amounting to 4897, being 33·5 per cent. of the total mortality.

Sex.—In the epidemic of 1832, at Hamburg, there were 1626 attacks and 877 deaths (53·9 per cent.) among males, and 1443 attacks and 732 deaths (50·7 per cent.) among females. I am not aware of the proportion of the two sexes in this city, but it may be presumed, from the number of deaths respectively, that the males suffered proportionally as well as absolutely more than the females. In a table by Suerman, relating to the epidemic of 1832 in Holland, in a given number of inhabitants the males suffered more than the females, the attacks being in the former in the ratio of 1·09 and in the latter of 0·93. In the metropolis the deaths were in 1848-49 thus distributed:—

Males	:	:	:	:	:	6957
Females	:	:	:	:	:	7633

The estimated population of London for 1849 is—males, 1,032,630; females, 1,173,446: this gives a percentage of deaths to the living, males ·67, females ·65, the mean being ·66. In the class of gentry the deaths of males are 168, of females 161; among tradesmen, males 989, females 1000; mechanics, males 5026, females 5306. If it be permissible to assume that, in the different districts of the metropolis, the proportionate number of the two sexes is about the same in these three classes, then it will follow that the males and females have suffered in varying degrees of severity in the five districts into which the metropolis is divided in the statistical tables appended to this Report. In the lunatic asylums the percentage of deaths among the males was 6·4, among the females 6·6; the attacks were in the males 8·9, and in the females 11·6 per cent. to the living. In a large pauper establishment the girls suffered more than the boys; but that depended on greater overcrowding. These results, so far as the instances extend, do not on the whole indicate any particular influence of sex on the progress of the disease; though, speaking generally, the male sex appears to have suffered more severely.

Occupation.—The tables in the Appendix show the absolute number of deaths in the metropolis, as they occurred in districts, and among the three well-marked classes of gentry, tradesmen, and mechanics, during the 60 weeks ending Nov. 24, 1849. The following is a brief summary of the results set forth in the document referred to:—

	Males.	Females	Total.	Proportion per cent. of Classes specified.		
				Males.	Females	Total.
1.—WEST DISTRICTS.						
a. Gentry	26	16	42	4.4	2.9	3.7
b. Tradesmen	67	78	145	11.5	14.3	12.9
c. Mechanics.	492	452	944	84.1	82.8	83.5
2.—NORTH DISTRICTS.						
a. Gentry	25	21	46	5.7	4.5	5.1
b. Tradesmen	93	86	179	21.4	18.3	19.8
c. Mechanics.	317	362	679	72.9	77.2	75.1
3.—CENTRAL DISTRICTS.						
a. Gentry	14	10	24	2.0	1.1	1.6
b. Tradesmen	111	78	189	16.1	9.0	12.1
c. Mechanics	566	780	1346	81.9	89.9	86.3
4.—EAST DISTRICTS.						
a. Gentry	15	15	30	1.0	1.1	1.0
b. Tradesmen	198	139	337	13.2	9.9	11.6
c. Mechanics.	1288	1248	2536	85.8	89.0	87.4
5.—SOUTH DISTRICTS.						
a. Gentry	88	99	187	3.0	3.1	3.0
b. Tradesmen	520	619	1139	17.5	19.5	18.5
c. Mechanics.	2363	2464	4827	79.5	77.4	78.5
6.—TOTAL OF METROPOLIS.						
a. Gentry.	168	161	329	2.7	2.5	2.6
b. Tradesmen	989	1000	1989	16.0	15.5	15.7
c. Mechanics	5026	5306	10332	81.3	82.0	81.7
Undescribed	774	1166	1940	..	..	..
Total	6957	7633	14590	..	..	..

Owing to the deficiency of statistical information no satisfactory deductions can be formed from these figures concerning the mortality of cholera as connected with occupation; since, as the Registrar-General remarks,—

“the occupations were only returned for the metropolis in a very general way by the Census Commissioners in 1841; and, in the trades, masters were not distinguished from men.”

As these and other omissions will doubtless be rectified in the approaching census of 1851, the ample details contained in Mr. Edwards's tables will hereafter supply very useful data in reference to this subject. At present it can only be stated in a general way, what is known from other sources of information, that the great pressure of the epidemic has, with scarcely an exception, fallen in all parts of the metropolis on the labouring classes; that tradesmen and their families have suffered next in degree; and that the higher classes or gentry experienced a comparative exemption.

Dr. Guy's Rough Approximation.—In the Report of the Registrar-General for the week ending December 22, 1849, Dr. Guy has given a

very interesting account of the professions or occupations of 4312 men of the age of 15 and upwards, who were destroyed by cholera, the ratio to the living being also calculated as accurately as the data available for that purpose would permit. This document will be found in the Appendix (see No. 4).

Medical Men.—The details collected by Dr. Guy would, if carefully scrutinised, afford many instructive results; a few remarks are all that can here be offered. As regards the first class (gentry and professional men), medical men stand fourth in the list, 16 having died out of 4240, or 1 in 265. During the last epidemic, as it prevailed in Hamburg, so few practitioners were attacked, that public attention was attracted to the circumstance. From the official Report of Dr. Buch, it appears that only two medical men were attacked, one of whom was a half-pay English surgeon not in practice; and the second lived out of the city, and had not, I believe, attended any case of cholera. In Berlin very few physicians were attacked, but the exact number is not known to me. This comparative exemption of a class, the members of which were incessantly engaged in attending on the victims of cholera, is an instructive fact, and is doubtless attributable, in addition to the advantages common to the rank of life to which medical men belong, to the care bestowed by them on their health, and especially to the prompt control of any tendency to bowel complaints. In several of the fatal attacks which occurred in London among medical men, the victims had, however, strange to say, suffered previously from neglected diarrhœa. One case is so remarkable as to merit a brief notice. It was that of a surgeon residing in Southwark, who was convinced he could check the attack of cholera by attending to the preceding diarrhœa, and this point he urged upon his patients. This gentleman, who was greatly overworked, and neglected his meals, was attacked with diarrhœa on Friday afternoon; this he neglected, and was in attendance on a midwifery case all Friday night, during which the diarrhœa continued and was still neglected. On Saturday morning, the symptoms becoming worse, advice was procured, and even then the patient objected to take medicine; collapse supervened, and this victim of a neglect which, under such circumstances, is almost incomprehensible, died at 5 A.M. on Sunday. Another decease, which deprived the science of surgery of one of its most successful cultivators, appears to have been in some degree connected with errors of diet, which must have operated most injuriously at a time when the epidemic was almost at its height, and especially in an individual predisposed to an attack by a most irritable state of the bowels. It may be proper to add, that several of the medical practitioners who were attacked had not attended a single case of cholera.

Artizans and Labourers.—In considering the class of “Artizans and Labourers,” it will be observed 1 in 65 died among labourers, and only 1 in 1572 of domestic men-servants. Out of 650 undertakers 2 died, or 1 in 325; a point of some interest, when it is recollected that these men have to handle the bodies of those who perished by the epidemic; and in connexion with this I may mention that, according to a statement with which I have been favoured by Mr. Wilkinson, a gentleman who has paid great attention to the sanitary state of Berlin, among the numerous body of men engaged by the company who con-

duct about one-half of the interments in that city, not a single case of cholera has occurred in any of the epidemics. Among persons exposed to the effluvia of organic matter the deaths were as follows :—Dustmen and scavengers, 6 in 234, or 1 in 39 ; butchers, 32 deaths in 5568, or 1 in 174 ; tanners, 1 in 39 ; tallow-chandlers, 1 in 430. These results are, on the whole, more favourable than might have been expected ; but it is essential to remark, that the abstract excludes all below the age of 15 ; whilst the influence of putrid animal effluvia more especially tells on infants and children, who form in all such cases the most delicate test.

Sailors and Watermen, &c.—Taking all the occupations which are connected with the river, such as sailors, watermen, bargemen, ballast-heavers, coal-porters, and fishermen, the results are unfavourable ; thus, of 7176 sailors, 299, or 1 in 24, died, and the same mortality prevailed among 168 ballast-heavers ; among the sailors, however, are included “ Greenwich Pensioners,” a class which was doubtless influenced by advanced age as well as locality, the Hospital being on the banks of the river. It has been shown by the Board of Health that seamen suffer to a vast extent from preventible disease, and this irrespective of the noxious influence of climate ; thus, in the port of London, the deaths among sailors in the years 1845, 1846, and 1848, from zymotic diseases, were 25·3 per cent. of the total mortality ; whilst the deaths in the metropolis generally, from the same class of diseases, among persons above 15 years of age was only 6·7 per cent.*

In some particular occupations of limited extent as to the numbers engaged in them the mortality was very high ; for example, among master-tradesmen, one fishmonger died in every 20, one paper-maker in 15, one poulterer in 32, and one egg-merchant in six. In some districts the mortality among the families of tradesmen was unusually high. One striking case, recorded by Dr. Gavin, occurred in Shoreditch, in which the proportionate mortality as to the rank of life was remarkably modified, as will appear in the following table, showing the percentage of deaths in the respective districts of Shoreditch and in the whole parish :—

Districts.	Gentry.	Tradesmen.	Labourers.
Hoxton New Town	18·1	69·0	12·7
Hoxton Old Town	2·7	88·8	8·3
Holywell	1·2	79·4	19·2
St. Leonard's	1·4	68·5	29·9
Haggerstone East	··	74·3	25·7
Haggerstone West	··	64·6	35·4
Total	2·3	66·6	30·9

The causes of this excess of deaths among the class of tradesmen will be illustrated in the section on the “ habitat ” of cholera, relating to the condition of Shoreditch. Dr. Gavin in reference to this peculiarity in vital statistics observes,—

* Report on Quarantine, pp. 92, 94.

“ This extraordinary mortality among the class of tradesmen in the parish of Shoreditch corroborates, in a surprising manner, the proof adduced by Mr. Chadwick, in the tables calculated from the Mortuary Returns, of the unhealthiness of different localities, and the pressure with which the local deleterious influences bore upon the different classes of society.

“ Thus it was shown, in the tables referred to, that the average age at death of all who died above the age of 21 years, in the parish of Shoreditch, was—

	Among the Class		
	Gentry.	Tradesmen.	Labourers.
	65	47	51
The average number of years' premature loss of life by death above the age of 21 } was }	..	15	11

“ The proportionate loss of life, therefore, among the class of tradesmen and labourers, was 57·6 and 42·3, which bears a close relation to the relative mortality per cent. from cholera among the two classes, 66·6 and 30·9.”

SECTION III.

On the Habitat or Seat of Cholera.

HAVING in the preceding section traced the progress of the late epidemic, as to the mortality, the influence of age and occupation, it is necessary now to enter upon a question of incomparably more importance, the habitat, namely, or seat of cholera. Notwithstanding the general appreciation of the fact that defective drainage, accumulations of filth, imperfect water-supply, and especially overcrowding and the want of ventilation, conduce to the spread of disease, and especially to the most destructive of all diseases, the zymotic; and notwithstanding, further, the many and strenuous efforts which were made both by the Board of Health and by the public press to expound and enforce this vital truth, it will appear in a subsequent page that all this did not prevent, in the presence of a disease specially liable to the influence in question, a great neglect of sanitary precautions on the part of the local authorities. Nor was a certain amount of scepticism wanting amongst the highest ranks of the medical profession. It was my lot frequently to listen to expressions of such incredulity, not unmingled with something of contempt, when the all-powerful influence of local causes in the propagation of fever, cholera, and other zymotic diseases was asserted. Knowing all this, and having witnessed, on the one hand, the frightful

evils resulting from the general rejection by the parochial authorities of the comprehensive measures laid down by the Board of Health for the public safety, and, on the other, the great and invariable benefits which followed even their partial application, I trust it may be permitted me, in this and some succeeding sections, to elucidate, so far as the metropolis is concerned, this double truth, by setting forth in some detail the large body of evidence acquired during the past year under the auspices of the Board of Health, of which it may be safely affirmed that it exceeds all the information hitherto obtained in Europe in relation to the special causes influencing the progress and spread of cholera.

In viewing the progress of cholera, whether from country to country, from city to city, or even among the inhabitants of any one city, there is, no doubt, much on the surface which appears to indicate that it extends from man to man; this is therefore the conclusion which one would expect the generality of mankind to form, as indeed they have formed, on the subject. It is seen, for example, that great masses of Hindoo pilgrims come together at their annual festivals in some sacred city free from cholera, and that soon afterwards the epidemic breaks forth among them and spreads with destructive energy, sweeping off thousands of victims, and then ceasing so soon as the vast crowd disperses in affright; or, again, in some European kingdom the epidemic decimates the cities, where men abound and intercourse is excessive, and spares the open country, where the population is limited and communication slight; or still further, persons in immediate contact with each other, so to speak, the members of the same families, the inmates of the same house, the wife who watches by the side of her husband's bed, the nurse who waits upon the sick,—these, being exposed to direct communication with an affected person, are sometimes attacked in succession; nay, it has been said that those who have washed the linen of cholera patients have been siezed with the fatal malady.* Then, again, it is affirmed, and with much truth, that the disease often follows the great tracts of human intercourse; that it passes, for example, along the banks of navigable rivers, where they form, as in many parts of the Continent, the main channels of communication.

That these and a thousand other instances of a like character which might easily be collected should have led to the inference above stated, is not surprising; but when they are more carefully scrutinized, much, if not the whole, of their weight disappears. It has been found, for example, by experience, that when the Hindoo worshippers quit the pestiferous and foul hovels in which they had been crammed together in their sacred city, though many carry with them the seeds of the affection, and die after their arrival in the pure air of the country, they do not communicate the disease to the villages around; that, although it is true the towns of Europe suffer more than the country, yet, when the circumstances both of the attack and the exemption are cautiously investigated, it becomes evident that neither the one nor the other can be explained on the ground of numbers; for it can be abundantly shown that great masses of people in incessant communication, if living in

* See a note in Appendix, No. 5, on this last point, by Dr. Waller Lewis.

cleanly and well-ventilated dwellings, escape; whilst the scattered inhabitants of villages, and even of isolated houses in the country, may be, and often have been, decimated by cholera, if their sanitary state is unfavourable. The following are selected from a multitude of similar examples, in illustration of the latter position.

East Farleigh Hop-pickers.—In the month of September a most fatal outbreak of cholera occurred in the parish of East Farleigh, near Maidstone, among the hop-pickers engaged on the farm in the occupation of Mr. Ellis, a large grower, and who employs about 1000 persons of all ages, of whom two-thirds are Irish. These people were lodged, for the most part, in various sheds and outbuildings, and some few in cottages, each consisting of a single room. On September 12, 1849, cholera broke out among these people, the first case being that of a man who had arrived the evening before, and who had been suffering from diarrhœa the day previously. The disease rapidly extended, so that in three or four days 70 or 80 persons were ill. The results were as follows:—

Attacks of developed cholera	.	.	.	97
Deaths	.	.	.	46

There was an enormous amount of diarrhœa; Dr. Plomley, of Maidstone, who was called to give his professional aid, having had under his observation 201 cases, and it is known that many more were attended by the other medical men. Having been instructed by the Board of Health to inquire into the causes of this attack, I made a careful examination of the premises, and received a large body of evidence from the medical men who had attended the sick, and from others. As I shall have occasion to present a special Report on this case, it will suffice to state here, as to the source of the mischief, that I entirely coincide in the recorded opinion of Dr. Plomley that—

“the disease which caused so great a loss of life, and consequently so much misery and distress to the survivors, arose entirely from causes which are remediable and removable, namely, impure air arising from overcrowded and ill-ventilated apartments; impure water derived from wells containing the soakage of cow-yards and human filth; and impure food sold at a cheap rate by unprincipled itinerant vendors of putrid fish and adulterated bread.”

That this is the true view of the case is corroborated by the fact that, according to Dr. Plomley's belief, not one of the hop-pickers belonging to the neighbourhood, and who slept at their own homes, was attacked with cholera. I have reason to believe that the overcrowding was inordinate: thus in one room, containing about 700 cubic feet, Dr. Plomley found at four in the morning 14 persons, which gives about 50 cubic feet to each, whilst 500 cubic feet for each person is the lowest allowance compatible with the maintenance of health. This gentleman adds, “the effluvium was so powerful that he could not enter the room; in it was a child suffering with cholera, and two other cases occurred in the same room.”*

* It is due to Mr. Ellis, who is only a tenant, to state that there are some particular circumstances connected with the property he holds; that, in consequence, improve-

There are some other points connected with this case which are instructive. It appears that on the same farm a severe attack of Asiatic cholera occurred in 1834, when 34 hop-pickers died, although the disease did not elsewhere prevail. At Barming, according to the statement of the Rev. H. W. Wilberforce, vicar of East Farleigh, is a farm, formerly in the holding of the same tenant who occupied the farm now held by Mr. Ellis at Farleigh, and at that time under the same plan of management. In 1845 the farm at Barming was taken by another occupier, one of whose first steps was to provide extensive buildings for the hop-pickers. In 1849 the first case of cholera in the neighbourhood occurred at this improved farm, but no second fatal case took place among 400 persons, owing, as it is believed, to the improvements that had been effected as to space and ventilation, and to prompt treatment of the premonitory diarrhœa. In proof of the direct advantages conferred by sanitary ameliorations, it may be stated that Mr. Lewis, an owner and occupier of land in East Farleigh, and who employs about 150 hop-pickers, and who has provided for them much better lodgings than the average accommodation, has had so little sickness among his people, that since his residence, 21 years, he has never had occasion to call in medical aid, though it is well known that sickness, especially low fever, diarrhœa, and dysentery, prevail generally among the hop-pickers, particularly in wet seasons; last year there was considerable diarrhœa among Mr. Lewis's people; but he, having engaged, prior to the outbreak of cholera, a medical practitioner to visit the people daily, every case of bowel complaint was arrested.

Attack of Cholera in a country village.—In a small country village in Wiltshire a severe attack took place, the disease being definitely limited to four cottages, which were known to be very much crowded, and are thus described by the vicar, in a letter with which he favoured me :—

"The cottages, four in number, and near together, were ill ventilated, badly drained, and with stagnant pools near them, the water of which was used for culinary purposes and generally for drinking: each cottage consisted of one living and one sleeping room, and contained from six to nine persons."

In these four cottages, thus combining several of the worst evils of a populous town, overcrowding, foul drinking-water, and noxious exhalations, no fewer than 16 cases of developed cholera and 7 deaths took place; in three of the cottages every individual was attacked, except the husband in each family: no other cholera attacks occurred in the village, though bowel complaints were general.

Illustrations of the influence of Locality.—The progress of the late epidemic through Europe, when carefully studied, has demonstrated that the principal determining cause of the spread of the disease—I do

ments relating to the accommodation of the hop-pickers have been delayed; and that it is intended these improvements should be made, probably before the next hop-season.

not here speak of the efficient cause of cholera, which is at present altogether unknown—is locality. In thus broadly advancing a position which is, with different modifications, held by the large majority of those who are practically acquainted with cholera, it is not of course intended to deny the powerful influence of other causes—such as constitution, mode of living, occupation, age, and so forth. What is meant to be asserted is, that, whether the general march of the epidemic be considered, or the progress of it in individual cities and in parts of cities, the main influential cause is connected with locality. In investigating this subject, and especially in considering the assertion that the march of the pestilence has followed in the direction of human communication, it is an interesting and important consideration that in several European countries—in Germany, France, and England—the lines of intercourse have been greatly changed in the interval between the first and last epidemics, between 1832 and 1848. Old routes have been abandoned, new ones have been opened; many towns and cities which in 1832 were the centres of travelling and traffic have become comparatively deserted, while others, then insignificant or even not in existence, have grown up into important channels; and, above all, the introduction and multiplication of steam-vessels on the ocean and on rivers, and of railways on the land, have in a multitude of instances totally changed the current of intercommunication. But it is a striking fact, that, in the midst of all these changes and deviations, the cholera has steadily held its course through one path; so bound is it to definite localities, that with some exceptions it has, so far as Europe is concerned, in each epidemic—in 1831-32, in 1837, and again in 1848—visited and avoided precisely the same countries and the same cities; it has re-appeared in the interior of towns on each occasion in its old haunts; it has come back after an interval of years into the same districts and streets; nay, it has, in various instances, even revisited identical houses, and, it is affirmed, the same rooms.* This unmistakable feature of the epidemic is even indicated by its general progress from one quarter of the globe to another, from east to west; for although there are some inconsiderable deviations, the disease observed rigorously the same route, attacking in the same order the same countries and the same cities in 1846-48 as in 1830-32.†

The following table, in which, however, there are several errors as to dates, taken from the treatise of M. Tardieu, places this fact in a striking point of view:—‡

* Dr. Swaagman states that at Groningen, in Holland, the disease in 1832 attacked in the better part of the city only two houses; and that the epidemic broke out in these two identical houses in the visitation of 1848.—(*Lancet*, vol. i., 1849, p. 109.)

† M. Lasègue, who was sent by the French Government to observe the progress of the disease in Russia, says that it has two modes of propagation: one in obedience to a force which impels it over vast tracts of country in a certain determinate direction; secondly, in obedience to subordinate laws, which cause it to disperse itself over towns situated on its course, and to prevail in them for a greater or less space of time. When thus localized, it seems to lose, as far as that particular city is concerned, its tendency to pass in a particular direction, the laws of its transmission from house to house not being identical with those which impel it from province to province.—(*British and Foreign Medico-Chir. Rev.*, January, 1849.) This is, no doubt, true generally, but many instances have occurred in this country which show that in towns the disease often obeys some special influence as to direction.

‡ See '*Cholera Epidémique*,' p. 99: Paris, 1849.

	Epidemic of 1830 to 1832.	Epidemic of 1846 to 1848.
Sallian	June 1830	28 Oct. 1846
Tiflis	13 „ „	2 June 1847
Astakhan	1 Aug. „	16 July „
Novotcherkask . .	30 „ „	30 „ „
Kazan	21 Sept. „	17 Sept. „
Moscow	30 „ „	30 „ „
Kiew	26 „ „	5 Oct. „
Mohilev	January 1831	12 Nov. „
St. Petersburg* . .	28 June „	8 July 1848
Berlin†	31 Aug. „	20 Aug. „
Vienna	14 Sept. „	No attack.
Hamburg	„ „	1 Sept. 1848
Sunderland	4 Nov. „	5 Oct. „
London‡	8 Feb. 1832	24 „ „
Coasts of France . .	15 Mar. „	November „

German Experience.—During a visit which I made to Germany in 1848, at the instance of the General Board, for the purpose of observing the cholera, several striking illustrations of what may be called this law of the disease, as to its march, came to my knowledge, some of which I beg to embody in the present Report.

The kingdom of Hanover, lying in the north of Germany—which, as at Berlin, Hamburg, and a multitude of other places, has suffered severely in 1831, 1834, 1847, and 1848—has, with one marked exception, escaped in all these epidemics. This single exception out of a whole kingdom was afforded by the town of Luneburg, which has suffered in each epidemic, and so severely in 1848, that, out of a population of 12,000 inhabitants, 500 cases of cholera and 250 deaths occurred in 20 days. In another direction, the kingdom of Saxony has been exempt; so again, the town of Frankfort-on-the-Maine, though forming the centre of a district in the towns of which cholera had in former epidemics prevailed, had, up to November, 1848, enjoyed an entire immunity.

Now, it cannot be said that there is anything as regards the mode of communication which can explain these marked phenomena; no attempt was made to stop the incessant intercourse between Hamburg, which has suffered in each epidemic, and the kingdom of Hanover; nor still less was the exemption of Frankfort owing to any restriction of communication.

Experience in the Metropolis.—The general progress of the epidemic, as to locality, in the metropolis, has amply illustrated the influence of noxious localities; since, with some few exceptions, where other obvious causes were in operation, the neglected, filthy, and overcrowded parts have been the special seat of the disease. In order to present a general

* This is erroneous: the epidemic began in the beginning of June, and on June 12 Dr. Müller reports 100 attacks and 33 deaths.

† The epidemic in Berlin, according to the official information given me, commenced on 27th of July; some isolated cases, as so often happens, occurred previously, namely in June.

‡ The first case occurred on September 22nd.

view of the habitat of Cholera, the two following tables have been prepared: the first shows the relative mortality of the epidemics of 1832-33 and of 1848-49 in the Superintendent-Registrar's districts; in the second table these districts are arranged according to the severity of the attack: and still further to indicate the locality with reference to an important point, they are distinguished according to their relation to the Thames:—

TABLE showing the Population of the Superintendent-Registrar's Districts in 1831 and 1849; and the Mortality from Cholera and Diarrhœa during both Epidemics, with the proportionate rate of Mortality to 1000 living.*

Superintendent-Registrar's District.	Population 1831.	Estimated Population 1849.	Deaths 1832-3.	Deaths 1849.	Proportion to 1000 living 1832.	Proportion to 1000 living 1849.
Bermondsey	29,741	39,672	210	883	7	22
Bethnal Green	62,018	85,109	345	976	5	11
Camberwell.	28,231	52,246	107	594	3	11
Chelsea	32,371	48,392	272	312	8	6
City of London	123,608	124,505	605	896	5	7
Clerkenwell.	47,634	65,725	65	157	1	2
George, St., in-the-East	38,505	43,142	123	268	3	6
Giles, St.	52,907	54,199	280	313	5	6
George, St., Hanover-square	58,209	74,533	74	161	1	2
Greenwich	63,564	93,964	149	894	2	10
Hackney	34,527	50,214	8	229	.2	5
Hampstead	8,588	11,457	..	12	..	1
Holborn.	42,696	44,386	46	194	1	4
Islington	37,316	76,929	39	242	1	3
Kensington	52,981	98,320	52	365	1	3
Lambeth	87,856	143,557	337	1824	4	13
Lewisham	18,426	26,796	..	128	..	5
Luke, St.	46,642	51,874	118	232	3	4
Martin, St., in-the-Fields	23,970	25,049	..	162	..	4
Marylebone.	122,206	151,706	355	333	3	2
Newington	44,526	64,137	200	1003	4	16
Pancras, St.	103,548	154,152	230	447	2	3
Poplar	25,066	36,729	101	402	4	11
Rotherhithe	12,875	13,894	19	406	1	29
Shoreditch	68,564	96,272	57	899	1	9
Southwark	91,501	104,747	1128	1928	12	18
Stepney	72,442	107,408	358	601	5	6
Strand	42,015	43,524	26	184	.06	4
Wandsworth	33,090	46,054	46	540	1	11
Westminster	85,220	77,299	450	666	5	9
Whitechapel	64,141	100,215	736	564	11	6

* This table, as regards 1832-33, has been constructed upon the only available documents; but it can, for that epidemic, be viewed as an approximation, since the returns relating to a period prior to the Act for the Registration of Births, Deaths, and Marriages, were doubtless in many instances defective. Thus in this table the mortality in "Clerkenwell" appears to have been higher in 1849 than in 1832; whereas Mr. Liddle states that this parish has suffered much less from the present visitation; and also mentions that in 1832-33 no fewer than 69 deaths occurred in the workhouse alone, while the total number for the whole district reported only amounts to 65. The mortality for 1848-49 is taken from the Returns of the Registrar-General.

BLE showing the Superintendent-Registrar's Districts, arranged in the order in which the Mortality from Cholera and Diarrhœa, proportionately to every 1000 living, was highest in the two Epidemics of 1832-33 and 1848-49.

er,	Epidemic of 1832-33.	Proportion to 1000 living.	Order.	Epidemic of 1848-49.	Proportion to 1000 living.
	<i>Southwark, S.</i>	12	1	<i>Rotherhithe, S.</i>	29
	<i>Whitechapel, N.</i>	11	2	<i>Bermondsey, S.</i>	22
	<i>Chelsea, N.</i>	8	3	<i>Southwark, S.</i>	18
	<i>Stepney, N.</i>	8	4	<i>Newington, S.</i>	16
	<i>Bermondsey, S.</i>	7	5	<i>Lambeth, S.</i>	13
	<i>Bethnal Green, N.</i>	5		<i>Bethnal Green, N.</i>	11
	<i>City of London, N.</i>	5	6	<i>Camberwell, S.</i>	11
	<i>St. Giles, N.</i>	5		<i>Poplar, N.</i>	11
	<i>Westminster, N.</i>	5		<i>Wandsworth, S.</i>	11
	<i>Lambeth, S.</i>	4	7	<i>Greenwich, S.</i>	10
	<i>Newington, S.</i>	4	8	<i>Shoreditch, N.</i>	9
	<i>Poplar, N.</i>	4		<i>Westminster, N.</i>	9
	<i>Camberwell, S.</i>	3	9	<i>City of London, N.</i>	7
	<i>St. George-in-the-East, N.</i>	3		<i>Chelsea, N.</i>	6
	<i>St. Luke, N.</i>	3		<i>St. George-in-the-East, N.</i>	6
	<i>Marylebone, N.</i>	3	10	<i>St. Giles, N.</i>	6
	<i>Greenwich, S.</i>	2		<i>Stepney, N.</i>	6
	<i>St. Pancras, N.</i>	2		<i>Whitechapel, N.</i>	6
	<i>Clerkenwell, N.</i>	1	11	<i>Hackney, N.</i>	5
	<i>St. George, Hanover-square, N.</i>	1		<i>Lewisham, S.</i>	5
	<i>Holborn, N.</i>	1		<i>Holborn, N.</i>	4
	<i>Islington, N.</i>	1	12	<i>St. Luke, N.</i>	4
	<i>Kensington, N.</i>	1		<i>St. Martin-in-the-Fields, N.</i>	4
	<i>Rotherhithe, S.</i>	1		<i>Strand, N.</i>	4
	<i>Shoreditch, N.</i>	1	13	<i>Islington, N.</i>	3
	<i>Wandsworth, S.</i>	1		<i>Kensington, N.</i>	3
	<i>Strand, N.</i>	0·06		<i>St. Pancras, N.</i>	3
	<i>St. Martin-in-the-Fields, N.</i>	0·02	14	<i>Clerkenwell, N.</i>	2
	<i>Hackney, N.</i>	0·02		<i>St. George, Hanover-square, N.</i>	2
	<i>Lewisham, S.</i>	0	15	<i>Marylebone, N.</i>	2
	<i>Hampstead, N.</i>	0		<i>Hampstead, N.</i>	0·09

NOTE.—The districts bordering on the Thames are marked by Italics. The districts are distinguished by the letters S. and N. as they are on the South or North sides of the river.

In the Appendix to this Report will be found a more important document, since it illustrates the weekly progress of the epidemic in the “sub-districts,” during the 60 weeks from October 7, 1848, to November 24, 1849, inclusive, which, for all practical purposes, may be considered as including the whole period of attack, as only three deaths occurred subsequently, the last being registered in the week ending December 22, 1849. To render this table more generally useful, columns have been added to the returns of the Registrar-General, on which it is founded, showing the total deaths in each “sub-district,” and the proportion of deaths to every 10,000 inhabitants. (See Appendix, No. 1.)

Tinted Cholera-Maps.—For the construction of an accurate Cholera-Map of the Metropolis it would have been requisite to have obtained

the amount of disease in each street ; but the expense, delay, and difficulties which this would have involved, prevented the realization of an object in itself most important. Under these circumstances a map has been prepared, which rests essentially on the return above referred to, showing the mortality in each sub-registration district. In the tinting, the depth of which shows the amount of mortality, the assistance of the Medical Inspectors has been given ; several of the medical officers have likewise kindly given much valuable aid in regard to the affected localities : among these gentlemen I may particularly mention Mr. Martin, Bermondsey ; Mr. Marshall, Walworth ; Mr. Hooper, Southwark ; Mr. Tebay and Mr. Pearce, Westminster. Several spots are marked, indicating local and circumscribed attacks of great severity. Lines have also been drawn on the cholera map, and sections corresponding to them are represented on a separate map, for the purpose of showing the elevation of the different parts of the metropolis above the level of high-water mark, together with the relative mortality, which is indicated by tinting. It is hoped that these maps will convey to the eye a tolerably accurate idea of the places on which the ravages of cholera principally fell, and, taken in combination with the various tables, will suffice to show the progress of the epidemic, so far as locality is concerned. Of the parishes of Bethnal-green and Shoreditch more exact maps have been prepared, under the direction of Dr. Gavin, resting on his own investigations, by which every death from cholera has been traced not only to the particular street in which it occurred, but even to the individual house.

Review of the Localities affected.—Two striking facts present themselves in reviewing these tables : first, that the localities south of the Thames have been the main seat of the epidemic ; second, that the districts bordering both sides of the river have collectively suffered much more than those removed from the stream. Thus, out of the 10 parishes and unions in which the percentage of deaths is highest, eight are placed on the south of the river ; whilst in all the southern districts, with a population of 585,067, or 26·5 per cent. of the whole population of the metropolis, no less than 8200 deaths, or 48·8 per cent. of the whole mortality, occurred : as regards the districts skirting the two sides of the river, their population amounts to 947,936, or 42·9 per cent. of the whole ; the deaths being here 9966, or 59·3 per cent. of the total mortality.

The tables of Mr. Edwards show, in detail, the influence of locality on persons of various ages, and in the three principal ranks of life ; and the following extract from the remarks of that gentleman will suffice to illustrate the subject :—

“ These tables (see Appendix, Nos. 2 and 3) are important as indicating that, where there are defective sanitary arrangements, there will be found an excessive mortality. It shows that in wealthy districts, where attention is paid to proper sewerage, where cleanliness is observed, there, comparatively speaking, cholera has been harmless ; and that where there is an almost total want of these appliances to health the epidemic has been most destructive.

“ If merely two districts of the metropolis are compared, viz. the north and south, the difference is most striking. The population at each age has been

taken as given in the census of 1841, for both districts, and the relative proportion of mortality to the living at each quinquennial period shown, and, in every instance, a fearful difference is indicated on the side of filth, overcrowding, and defective drainage. In the north district the mortality at all ages was only .26 per cent. to the living, whilst in the south it was 1.47 per cent. or nearly 6 times greater; but if the mortality at each age is taken together with the population, the difference is still more apparent. Thus, in the following table it is made clear that at every period of age there is a considerable excess, which is more marked as the ages progress: thus from 60 years of age and upwards in the north district, only 1 per cent. of the population died, whilst in the south 3.9 per cent. perished, showing a difference against the south district of 2.9 per cent. or 29 in 1000 living; thus demonstrating that the south district contains in itself an immense amount of exciting causes of disease.

DISTRICT.	Under 5.	5 and under 10.	10 and under 15.	15 and under 20.	20 and under 25.	25 and under 30.	30 and under 35.	35 and under 40.	40 and under 45.	45 and under 50.	50 and under 55.
South	1.8	.4	1.3	.7	.6	1.0	1.2	1.8	1.1	2.3	2.2
North . . . . .	.3	.1	.2	.1	.1	.2	.2	.2	.3	.5	.5
Mortality excess of } South over North. }	.6	.3	.6	.6	.5	.8	1.	1.6	.8	1.8	1.7

DISTRICT.	55 and under 60.	60 and under 65.	65 and under 70.	70 and under 75.	75 and under 80.	80 and under 85.	85 and under 90.	90 and under 95.	95 and under 100.	100 and upwards.	All Ages.
South	3.5	2.7	4.4	4.1	5.6	6.9	11.4	5.9	..	..	2.1.47
North . . . . .	.6	.8	1.1	1.1	1.3	1.3	2.8	2.5	..	..	.26
Mortality excess of } South over North }	2.9	1.9	3.3	3.	4.3	5.6	8.6	3.4	..	..	1.21

“It should also be borne in mind that the south district embraces many localities which are proverbially healthy, such as Dulwich, Norwood, Brixton; and the great excess therefore arises in those districts where there is defective sewerage, overcrowding, &c.: such as part of the parish of Lambeth, the parishes of Bermondsey, Rotherhithe; St. Olave, St. Saviour, St. George, Southwark; and Newington.

“The excess of deaths, therefore, in these particular parishes, must be considerably greater than has been stated above.”

River Localities.—By referring to the tinted map of London, which shows the more precise seat of the mortality in each district, the intimate relation existing between the activity of the disease and proximity of the river will become still more apparent; the dark colour, which indicates the relative mortality, showing, even at a distance, the general course of the Thames. A similar effect was produced by the river Lea, as it runs through Hackney union: thus, in a cluster of cottages at High-hill Ferry, where, however, other causes of insalubrity also operate, Dr. Gavin states six deaths took place, besides which 84 cases of choleraic diarrhœa were discovered during the house-to-house visitation.

This relation between cholera and rivers running through large towns has been very generally remarked; and extended observation seems to show that one main cause of it is the large evaporating surface of foul water which is thus formed. It is almost needless to point out that, when the numerous sewers of a city reach the stream, one part of their contents, widely mingling with a large body of water, undergoes solution, and thus presents a physical condition favourable to its subsequent escape into the atmosphere in the form of mephitic gases; whilst other portions, owing to the diminished velocity, sink to the bottom near the edge of the river, and thus become deposited on the banks of putrid mud, which will, at the next tide, being laid bare to the action of the sun and air, exhale poisonous effluvia. Some facts have come to my knowledge which tend to support this, the common view, by showing that it is precisely in those spots of the stream which receive the principal body of sewage that cholera specially ravages the adjoining population. In the important work of Dr. Rothenburg on the cholera of 1832, as it occurred at Hamburg,* and which contains by far the most comprehensive statistical account of the disease that has ever been published, it is shown that in those streets which immediately face the spot where the numerous canals that have traversed the city, and have become loaded with the excreta of 175,000 people, concentrate to pour their foul contents into the Elbe, the cholera raged so violently as to destroy 3·01 per cent. of the inhabitants; whilst the other and purer parts of the river suffered much less. It is remarkable that the street at Berlin already referred to as having suffered severely, occupies on the map of that city precisely the same spot as the above locality at Hamburg, being, in fact, placed just where the numerous branches of the Spree, which go off from the river at its entrance into the city, again re-enter it, like a huge Fleet-ditch, after being loaded, as was pointed out to me, with all the filth from the drains and débris of the houses. In the small town of Chesham, where a severe outbreak of cholera took place in 1848, I found that the focus of the disease was a place called Water-side, situated below the town and close to the little river Chess, which, entering the place as a sparkling stream, becomes subsequently poisoned by the putrid matters from tanners' yards, slaughter-houses, and cesspools.

As it appears from these, and other similar facts, that—whatever may be the other circumstances affecting the inhabitants of river localities; whatever may be their mode of life, the quality of the water they consume, or the nature of their occupation—those who reside on the borders of rivers, whether in cities or small towns, in England or in other countries, become the special victims of cholera, it is difficult to arrive at any other conclusion than that streams polluted by the refuse of large masses of people so deteriorate the air as to operate in the time of a destructive epidemic, when all depressing agents have increased force, injuriously on the human frame, and thereby predispose it to the attacks of disease.

Influence of Elevation.—Another cause operating injuriously on river localities is doubtless their low and damp situation; a condition which particularly applies to the parts of London lying to the south of

* 'Die Cholera-Epidemie des Jahres 1832, in Hamburg.'

the Thames, which are built in fact upon what was originally a marsh, and the drainage of which is still most defective. Considerable attention has, especially in late years, been directed to the influence of altitude on epidemic diseases; and this unquestionably operates most powerfully, particularly where the elevation is very great, as in mountain ranges.

The work of M. Boudin, "*Essai de Géographie Médicale*," contains much interesting matter on the point in question. Another observer, Dr. Fourcault, speaking of the influence of geological and hydrological conditions on the progress of the cholera in France, remarks that

"the cities and villages disposed in an amphitheatre, and where the population is submitted to the same regimen and to the same social conditions, have, in general, presented three distinct zones: the inferior, the most humid, has been the principal focus; in the middle, the epidemic loses a part of its activity; in the superior zone, it is almost or entirely extinguished, according to the elevation, the direction of the mountain, the nature of the soil, and the mineralogical composition of the deep strata."

M. Fourcault further observes that the mouths of rivers have been the principal theatre of the ravages of cholera, whilst it has scarcely ever shown itself at their source; that the disease appears to have been stopped in the regions where the streams run on primitive rocks, where little alluvium is found; and that villages placed in the midst of loops formed by rivers have specially suffered.* It is remarkable that the parish of Rotherhithe, which is situated in such a loop of the Thames, suffered in the last epidemic more severely than any other in the metropolis; but this was far from being the case in 1832. An interesting diagram published by the Registrar-General shows the average elevation of the several districts, together with the relative mortality during the 52 weeks ending September 29, 1849. The general result is that the deaths have diminished in proportion to altitude; so that, whilst at the elevated village of Hampstead the mortality is only 8 in 10,000, in Southwark, Bermondsey, and Rotherhithe, which are below high-water mark, the deaths are, respectively, 164, 189, and 263 in 10,000. (See Map in Appendix.) The rule, however, is by no means rigorously observed, there being several exceptions, which, it is thought by Mr. B. Smith, who has given an interesting paper on the subject, may be explained by other local causes.† The whole question is one of importance, especially as concerns the site for public institutions, in some of which, owing to a bad selection, a large sacrifice of life has occurred.

Special Localities attacked.—In examining the mortality tables, and comparing the several districts one with another, it may excite some surprise to find that localities which combine more noxious influences than others have yet escaped with fewer losses; thus Whitechapel, St. Giles, and St. George-in-the-East, have suffered less than Camberwell and Wandsworth. It will also be remarked that several of the districts have changed places in the lists of 1832-33 and 1848-49, the most remarkable example of which is furnished by Rotherhithe, a parish very low down in the scale of death in the former period, whilst it

* *Gazette Médicale*, 1849, page 338.

† See Mr. Smith's paper in the *Medical Times*, November, 1849.

stands first in the late epidemic. These and many other seeming contradictions have always attended the march of cholera; but although they cannot in the existing state of knowledge always be satisfactorily explained or understood, they should be regarded like the so-called exceptions in physical and physiological science, and should in no degree be permitted to mislead the observer, as to the essential circumstances which determine the active seat of the disease. A country or a city may escape, although it contains spots suitable to the development of the epidemic if the germs of it are sown, and another country or town, perhaps even more healthy, may suffer; but yet it is found that, whenever and wherever the efficient cause of cholera is present, it selects as the special sphere of action but one class of localities; whether the attack concerns the heart of London, a country village, or even a single group of houses, the general condition of these places will be the same.

Cholera attacks in Groups.—One of the most constant laws connected with the progress of cholera, and which is as evidently dependent on locality as it is inexplicable on the score of human intercourse, is that, when the epidemic makes its appearance in a city, town, or even village, it attacks in groups; that is, the disease seizes on a certain number of courts, alleys, or streets, or on a certain cluster of houses; decimates their inhabitants; then ceases, and breaks out in a similar manner elsewhere, occasionally returning again to the first locality. All who have seen the disease are familiar with this feature, which exactly corresponds with what is observed in typhus, which often attacks certain houses in towns, and cottages in the country; single farm-houses have often been thus selected. In such instances as these—and many very striking ones occurred in London during the late epidemic—the pestilence is often as definitely bounded by locality as if surrounded by an impassable line; and, which is important, when it assaults a fresh locality, it does not do so by continuity, passing from one court into the next adjoining, but it leaps suddenly, so to speak, to some distant place. The same remark applies to different countries, so that we have seen that at one bound it has passed from London to Paris, missing the intervening places. There is so much certainty as to this mode of attack, that those who are engaged in the management of the epidemic, and especially in house-to-house visitation, must look for it, and make their arrangements accordingly. It will not escape observation, that, although this peculiarity makes alertness thus essential, it at the same time greatly facilitates the application of preventive measures, as a staff of medical visitors could be readily transferred, as the occasion arose, from district to district, a procedure which was often adopted by the medical inspectors.

Another and well-known peculiarity, which evidently is not connected with persons, is that cholera often attacks in certain definite directions, herein again conforming to another member of the zymotic class, the plague. Thus localities facing in a particular direction have in India and Europe suffered, whilst others, immediately contiguous, have escaped; one side of a street, for example, may so suffer, and the opposite side be exempt. A remarkable instance of this occurred in Rotherhithe, where many of the houses on one side of a street occupied by respectable private families were attacked, whilst

only one house on the other side suffered. The medical officer of this parish (where the epidemic was more developed than in any other part of London), Mr. Chandler, also remarked that in several instances the disease attacked in a definite line or direction, passing right through or across several streets "like a cannon-ball." I have been informed of other instances like these; at Bedford, for example, two streets were named as having each suffered on one side severely, the other side almost or entirely escaping. The same fact is noticed by Dr. Crawford in respect to St. Petersburg.

In proceeding to inquire what is the condition of all those places in which the force of the epidemic is specially developed, a clue will be found in the fact, so distinctly established by the researches of the Metropolitan Sanitary Commission, that the habitat of fever and the habitat of cholera are one and the same. So clearly did this great truth appear, that, prior to the return of the dreaded epidemic to our shores, the Commissioners did not hesitate to affirm that the typhus track would, on the re-appearance of cholera, become the cholera track, a prediction which, amidst all the seeming capriciousness of the disease, has been but too fatally realized in the late visitation. It is, doubtless, a painful thing to make out, with the demonstrative evidence of statistical returns, all the elementary parts which go to form this common track of sickness, suffering, and death; and yet, as the great desideratum in sanitary as in all other investigations is the attainment of certainty, it is a point of infinite promise for the future to demonstrate that, whatever may be the aspect of the epidemic which is traced to its home, typhus, scarlatina, smallpox, or cholera, we find but one class of causes, or, to typify the whole in a single word, but one cause, and that filth, standing in the relation of the prolific parent of all this diversified offspring, as it presents itself in the courts and alleys of London. It is not a question of food, for people worse fed than thousands who have become the victims of these diseases, provided they breathe day and night the fresh and bracing atmosphere of the country, escape; whilst instances are not wanting of persons amply provided with every physical comfort, lacking only pure air, falling under epidemic attacks.

A remarkable example of the latter kind was afforded by an institution in which young women were received for the purpose of reformation, and where so destructive an outbreak of cholera occurred, that out of 96 inmates 40 were seized with cholera, of whom no fewer than 15, or 15 per cent., died. On inquiry into the causes of this violent attack, it appeared that there was nothing in the state of the neighbourhood, although this was in many points most defective, which could alone account for it. Nor could the general mode of living be assumed as the cause, since the diet was ample, good meat being provided six days out of the seven: in short, after a careful investigation, the only reasonable cause that could be assigned was an impure atmosphere caused by the want of ventilation in the dormitories, in several of which the windows had been partly closed up, and which were, moreover, much crowded.

It is then in filth, that is, in decomposing organic matter, that the main predisposing causes of epidemic diseases are to be sought out—filthy alleys, filthy houses, filthy air, filthy water, and filthy persons. This being so, and as in the spread of zymotic affections the agency of

the predisposing is even more important than the mere presence of the efficient causes, it is evident that sanitary science, when all its capabilities and applications shall have been developed, and the sources of filth of every description shall have been obviated, will reduce within comparatively narrow limits a class of disease which so often sets at defiance the powers of medicine, so long as these are only aimed at a curative result. The reports of the medical inspectors abound in facts, derived from every part of the metropolis, confirmatory of the positions here assumed; but as the condition of Bethnal-green has been made the subject of a most careful and elaborate investigation by Dr. Gavin, this parish, though not specially distinguished as to its sanitary state from many others, will be selected for the sake of general illustration; and in order to bring before the eye the particular localities attacked, a tinted map, carefully prepared by the gentleman just named, accompanies the present Report.

BETHNAL-GREEN.—In his important work on the sanitary condition of the labouring population, Mr. Chadwick has given a map of this parish, tinted and marked so as to show the mortality from epidemic diseases and diseases affected by localities, for 1838. If this be compared with Dr. Gavin's cholera map, it will be seen that there is a remarkable correspondence between them, the western parts of the parish having in both cases especially suffered.

There are in Bethnal-green four registration districts, called "the Green," "Church," "Town," and "Hackney-road." The state of health in these districts may be judged of by the following table, constructed from Dr. Gavin's Report, showing the deaths to the population from all causes, from zymotic diseases, and from cholera:—

	All Causes.	Zymotic.	Cholera.
Town	1 in 43	1 in 137	1 in 89·4
Hackney-road . . .	1 in 50	1 in 196	1 in 69·7
Green	1 in 57	1 in 132	1 in 99·0
Church	1 in 50	1 in 260	1 in 165·0

The actual mortality from cholera and diarrhœa, in the four districts, was as follows:—

	Cholera in 1848.	Cholera in 1849.	Diarrhœa in 1849.	Total.
Town	8	216	33	257
Hackney-road . . .	13	288	29	330
Green	1	151	42	194
Church	5	97	18	120
Total	27	752	122	901

It thus appears that in the late epidemic the districts have suffered in this order:—

1. Hackney-road	1	death in 69·7 of the living.
2. Town	1	„ 89·4 „
3. Green	1	„ 99· „
4. Church	1	„ 165· „

If particular spots and individual houses be selected, the mortality arising from the causes presently to be considered—all of which, it must never be forgotten, are susceptible of removal, or of great amelioration—is sometimes found to be enormous. Thus in a district behind Shoreditch Church, but in Bethnal-green parish, and forming parts of the Town and Hackney-road districts, in 16 days, from August 16th to the 31st, there were 211 deaths from cholera and 18 from diarrhœa : “a space of about 400 yards by 150 would include a great part of the district which furnished this excessive mortality.”

In some of the streets in this afflicted locality the amount of disease was appalling. Thus, in Old Nichol-street, in 23 houses 33 deaths occurred, three persons dying in one house, and four in another ; besides which there were 17 cases of cholera that recovered, 9 cases approaching cholera treated by the parochial medical officer, and no less than 197 cases of diarrhœa discovered by the visitors. In New Nichol-street closely adjoining, 21 deaths, 30 cholera cases not fatal, and 13 approaching cholera, whilst the visitors discovered 135 cases of diarrhœa and 2 of approaching cholera. In Half Nichol-street 24 fatal cases occurred, 20 cases not fatal, and 3 of approaching cholera ; and the visitors discovered 152 cases of diarrhœa and 4 of approaching cholera. In one house, No. 1, Collingwood-street, within five days no fewer than six deaths took place, owing, as Dr. Gavin states, to overcrowding.

The virulence of the disease in the two districts above-named may be estimated by the fact, that in six streets no less than 147 deaths occurred in 99 houses, being in the ratio of $1\frac{1}{2}$ to each house.

It is impossible to give in any detail an account of the sanitary state of the localities where such destructive ravages have been committed ; a few extracts only are permissible. In alluding to the influenza which prevailed in 1847, Dr. Gavin mentions a most elucidative fact ; he says, while there was little increase in the usual mortality in the healthy and clean streets, the mortality was quintupled in the unhealthy and dirty streets. Among the principal of these causes of filth he places the accumulation of solid refuse.

Nor can this be a matter of surprise when it is stated that the solid refuse is never completely removed from the premises, so that in process of time the back yards in several localities have by this accumulation been so raised as to be nearly on a level with what might be termed the first floors of the houses.

House-drainage is nearly entirely wanting, so that the poor inhabitants are compelled to throw their fluid refuse into the gardens, yards, or streets. As showing the utter neglect of this important point, it may be stated that a few years ago 1000 yards of sewer were made from Pollard's-row to Shoreditch Church, and yet not a dozen houses formed a connexion with it.

“*Privies.*—One open privy for numerous families, and for 20, 30, or 50 persons, is surely most objectionable, but it is quite a common occurrence. In many instances the soil has infiltrated the walls, and percolated through into the houses ; and in some cases the floors have been saturated, and have thus been rotted and rendered very quagmires of filth.”

The landlords of the poorer tenements very rarely remove the contents of the cesspools, and neglect to do so till compelled by the devastation which the exhalations produce in the form of fever, and alarmed lest their property should get a bad name. The poor, left to rot in their filth, sometimes attempt to rid themselves of this nuisance, and fancy they effect it by burying the soil in their yards.

Water-supply.—In some instances the supply is from wells placed in these yards, so that the water necessarily becomes tainted. In an immense number of instances no water is laid on, the only supply being a stand-pipe, and sometimes only one of these for 20 or even 30 houses. The supply is, as usual, thrice weekly, for two hours at a time. To many houses there is no supply whatever, and the inhabitants beg it, or procure it as they best can.

Graveyards.—This parish seems to suffer, in a special degree, from the evils of intramural interments. Thus it is a practice to deposit corpses in the vaults below the rooms of the National and Infant Schools attached to St. Matthew's Church; in four vaults thus strangely placed, and which are used as public catacombs, Dr. Gavin counted 96 coffins, piled one on another like bales of goods. There is a large aperture for the emission of air from these vaults, which is close under the back entrance of the school. Two years ago, on examining this place, Dr. Gavin was overcome with nausea, caused by the stench either from the catacombs or from a most foul privy adjoining. In the churchyard of St. Matthew's common graves were dug for the victims of the late epidemic, and were affirmed to have been the cause of sickness in the immediate vicinity. It is certain that the children suffered most seriously, no less than 275 boys and 135 girls having been nearly universally affected with illness.

Nuisances.—There are several serious nuisances, especially night-men's yards, slaughter-houses, &c., which greatly deteriorate the air, and operate deleteriously in the propagation of cholera.

Bad Construction of Houses.—All these evils are much aggravated in consequence of the houses having been generally built without any regard to levels; so that, when the streets and footpaths are properly made and levelled, the houses are frequently sunk below the surface, and thus become excessively damp, the ground-floor often resembling under-ground cellars; and yet these are the houses which generally are altogether unprovided with drains.

Of the Hackney-road district, standing first in the cholera list, Dr. Gavin reports, in a valuable statistical work, published, it should be stated, *before* the arrival of cholera—

“ This district exceeds all the others in filth, disease, mortality, poverty, and wretchedness; it abounds with the most foul courts, and is characterized by the prevalence of the greatest nuisances and perennial foulness. For many years this district has been notorious as the hotbed of epidemics. This is easily explained when the foulness of the streets, and the nearly total absence of drainage and house-cleansing, are considered; the drainage is, in fact, characteristic of barbarism. Some of the houses are built over the drains, which are very near the surface; the streets are perpetually covered with the most offensive mud; the population is very dense, as many as 30 persons in a single house.” “ Each room contains a family, with a bed common to all; generally it is a work-room as well as a dwelling-room.” “ Ventilation in these rooms is in the most defective state; the

atmosphere is most oppressive, and loaded with unhealthy emanations ; it is a common practice to retain the fæcal remains in the rooms, to avoid exposure and the perfect nastiness of the common privies." "All the tenements in Greengate-gardens are unfit for human habitation."

The general result of Dr. *Gavin's* experience of these evils is thus expressed :—

"There is scarcely an exception to the almost absolute rule, that where filth prevails there cholera locates itself. The more closely I have examined the localities in which cholera prevails, the more profound is my conviction of the truth, that, with the exception of a very limited number of other predisposing causes, such as emotions of the mind and constitutional debility, predisposition from previous disease, or impropriety or abuse of diet, local causes alone determine who shall escape and who shall perish from cholera."

CHURCH AND GREEN DISTRICTS.—Although these two districts of the parish are shown, on the whole, to be more healthy than those already noticed, they abound, in parts of their extent, in narrow alleys, often forming cul-de-sacs without drainage, and strewed on the surface with refuse and garbage. One cause of disease, of a peculiar character, has operated most unfavourably on the inhabitants. Owing to the pressure of that most evil circumstance—deficient house accommodation—a process of transformation has been going on during the last twenty years or more, by which, what were in happier times the summer-houses of the numerous gardens of the industrious tradesmen and weavers, have been converted into habitations. These wooden sheds, placed on the bare ground, are approached by narrow lanes, which are unpaved, nearly all in a muddy and filthy state, especially in wet weather.

"These dwellings," says Dr. Gavin, "in some instances are unfit to house cattle in ; in other, but very few instances (I think I could count the exceptions), they are tolerably clean. They are totally without drainage of any kind, except into shallow cesspools ; they are, consequently, extremely damp, and the inhabitants suffer much from rheumatism, from fever, from diseases of the respiratory and digestive organs, &c. There is very seldom any water laid on to the houses ; one stand-tap generally supplies 5, 10, or 16 houses : many houses are altogether without water."

"*Beckford-row* is a narrow confined row of 16 houses, or rather hovels ; the 8 southern houses are back to back ; they are 2-roomed, with families in each room. The place is abominably filthy ; a foul central choked-up gutter, overflowing and exposed privies, and decaying refuse, characterise the place. In 1847, in 14 weeks, 13 cases of fever and 1 of erysipelas occurred. The supply of water is from a small barrel, 21 inches in diameter and 12 deep, which is filled thrice a week. The escape of this place from cholera at the time when it first appeared was considered a remarkable exception to the law which governs its habitat ; but the surprise did not last long ; in a few days 8 persons perished of cholera and 2 of diarrhœa in these houses. In fact, the death of a certain number of the inhabitants of this row from cholera was as sure as if the warrant of execution had gone forth against them."

These facts plainly indicate that, whatever difference there may be in the mortality of these districts, it is not attributable, with a few limited exceptions where sewerage and macadamized roads have been introduced, to any sanitary precautions, but rather to the accidental circumstance of there still being much open ground, and consequently a freer supply of air.

Instances of other parts of the Metropolis.—Having given this connected sketch of the sanitary condition of one populous district, it will be proper to select from the large body of evidence contained in the Reports of the Medical Inspectors, and from other sources of information, specimens of the kind of localities in which the epidemic more especially prevailed in other parts of the metropolis.

WHITECHAPEL.—Dr. *Allison*, one of the surgeons of Whitechapel Union, in a letter addressed to Mr. Liddle, Medical Inspector, gives the following painful description of Christopher-court, Rosemary-lane :—

“The court is a cul-de-sac; the entrance is narrow, and covered over by the houses in Rosemary-lane; at the upper end is a large dust-hole, full of filth of every description. Out of the inhabitants, 60 in number, 13, or 21 per cent., were attacked with cholera. There were, on the first floor of one house, eight cases of cholera, of which three were fatal; the door at the foot of the stairs was shut, and on opening it I was repeatedly driven back by the horrid odour and stench from a privy down stairs. This was one of the dirtiest places which human beings ever visited; the stench, the horrible stench which polluted the place, seemed to be closed in hermetically among the people; not a breath of fresh air reached them, all was abominable. After getting up stairs my head reeled in the sickening atmosphere; and on reaching the top, and surrounded by the dead and dying, I was compelled to rush to the window and open it. I threw off the contents of my stomach, and supported myself on the miserable, rotten straw bed. To my Report on such agonizing and pestilential scenes was owing the immediate cleansing of this Augean stable; several of the cases were removed to the cholera hospital, and the disease has not reappeared. In the same court, on the opposite side, were several cases of cholera. In one house, on the ground floor, were three cases; the smell from the privy down stairs was fearful, and it required some courage to go down and search for the plague-spot. I found the privy overflowing directly below the beds of the sick persons, and the cellar containing an immense quantity of excrement, bones, urine, and straw. The worst sewer in London could not have been more dangerous to life. A fatal case occurred next door.”

In another of these deadly courts, Peter's-court, noted for a grating which sends its pestilential vapours into the place, Dr. *Allison* attended a rapidly fatal case; and in the cellar beneath found a privy overflowing, and the ground soaked with fluid excrement :—

“Other cases occurred on the next stair. The nuisances were removed, and I have not been called to any fresh case of sickness in that spot. In short, I have found the connexion between filth and cholera inseparable; they co-exist. I do not say that filth originates cholera; but where it is, there cholera flourishes and extends. It seems to be a soil well adapted for the rapid growth and development of all its horrors; the bud soon becomes a large blossom, and the fruit is death. I find that wherever cleanliness, sobriety, pure air, and pure water are enjoyed, there the genius of cholera never or rarely is known.”

These awful revelations may appear almost incredible to those unacquainted with the homes of the London poor in populous districts; but scenes like these, varied only in their degree of intensity, are familiar to the medical officers and others, who habitually visit these miserable abodes of sickness, suffering, and death.

Mr. *Byles*, another of the surgeons of the Whitechapel Union,

speaking of Hunt-court, Mile-end New Town, containing about 300 inhabitants, says,—

“Before the cholera appeared in the district, I predicted that this court would be one of its strongholds, and I recommended that a high wall at the eastern end of the court should be removed, as a free current of air from an extensive space of ground would thus be admitted. I do not think there is any other source of water than a stand-pipe, and, consequently, the stench from the open grating of the sewer is overpowering. I had last year (1848) more trouble with that court, in connexion with typhus, than any part of the hamlet.”

This prediction of Mr. Byles was fatally realised, since no less than 18 attacks of cholera occurred.

Irish Wakes.—Before quitting this notice of Whitechapel, it is proper to point out the enormous evils connected with the Irish custom of “wakes;” to which, independent of the utter demoralization induced, many lives were sacrificed. Mr. *Liddle* thus describes one of those scenes :—

“In Hairbrain-court, Rosemary-lane, an old woman having died of cholera without any medical attendance, an inquest was held on the body. Pending the inquest, which was adjourned, two children living in the same room were taken ill, of whom one died; and then the ceremony of wake was performed. About a dozen acquaintances of the deceased met together in this small room, 10 feet wide, 12 feet long, and 10 feet high; and with only one window, opening into a narrow, crowded, and, at that time, most filthy court. These people assembled in front of the corpses, some smoking, and all drinking. The other poor child, who was just beginning to recover from collapse, was lying in a corner of the room. Almost immediately after this scene, the father and mother of the children, who had been present at the wake, were seized with cholera of a very severe form, though they fortunately recovered; but another person, who had also been present, was attacked and died.”

CLERKENWELL.—The following case will serve at once to illustrate the character of the dwellings to which many of the poor of this vast metropolis are often consigned, and also the kind of influence which, in the present state of the law, stands in the way of their improvement. A charge of neglecting to visit a certain house where a case of diarrhœa had occurred was preferred against Mr. Horner, one of the medical visitors of Clerkenwell, and, being called before the guardians, he stated “he had not visited the house in question, because, being in an out-of-way corner, where there was a public dusthole and a dunghill, he considered it was a place inhabited by horses and not human beings.” Hereupon one of the guardians present, who happened to be the owner of the place to which the charge related, arose in anger, and expressed a doubt whether Mr. Horner had visited the locality at all, as he could not imagine how any person in the full possession of his senses could possibly fail of perceiving the house he had overlooked. Another guardian said, “the defence was quite satisfactory, and that, although his brother guardian might consider the place as valuable as diamonds, still a casual and unprejudiced observer might pass it by unnoticed.”

ISLINGTON.—Mr. *Liddle* gives the history of another very melancholy instance of the dire effects of a neglected sanitary condition, which, occurring on the verge of the country, shows that no advantage

of this kind can counterbalance the baneful influence of a locally poisoned atmosphere :—

“In Rutland-place, Holloway, out of about 120 persons occupying 10 houses, each of 4 rooms, about 10 feet square, 27 cases of cholera occurred within 4 weeks (22·5 per cent.), out of which 14 were fatal (11·6 per cent.); and every person in the row had severe diarrhœa.* The houses are double fronted, and have consequently no windows behind for ventilation, and no back yards. In one of the rooms of No. 4 seven persons lodge. Only two of the houses are supplied with water. There is no provision of any kind made for the drainage of this place, except at the privies, which I believe empty themselves into a drain; and as the ground-floors of the houses are not raised above the surface of the earth, they are very damp. At No. 10, nine persons were attacked with cholera, five of whom died. The medical officer informed me that many of the cases in this place were quickly fatal; some of the sufferers were seized at work and died in a few hours. After death had done its fearful work in this locality several of the children were removed to the house of refuge, and the plague was stayed.”

Mr. Liddle adduces this as a proof of the disastrous results which were caused by the guardians neglecting to comply with the order of the Board of Health directing houses of refuge to be opened.

In Brand-street, Holloway, with 40 houses, the mortality was also very severe, 21 persons dying out of 350, or 6 per cent., and nearly all the inhabitants were attacked with diarrhœa :—

“Brand-street is entirely without drainage, and at the time of my visit,” says Mr. Liddle, “the rooms of some of the houses were completely flooded, water to the depth of an inch or two lying upon the floors of the lower rooms, so that the persons inhabiting them were compelled to walk about in pattens. In some the floors were rotten, and stagnant water, to the depth of several inches, was lying underneath. At No. 7 and 8 I found the privies quite full, and in so dilapidated a state that in wet weather the water and the soil overflow into the sitting-rooms. At No. 7 three deaths from cholera occurred at the same time, and the like number in another house within a few doors. The houses in this street are exceedingly overcrowded, and this circumstance, together with the low moral condition of the inhabitants, Mr. Donald, the medical officer, thinks has contributed largely to the spread of disease.”

Mr. Donald, in a report, says of Brand-street,—

“This street has been much improved by the parochial officers during the last year; but the houses are much overcrowded and dirty, and almost unfit for habitation.”

After descriptions of this painful nature it can excite no surprise that Mr. Liddle concludes this part of his Report by stating that—

“nearly all the medical visitors of the unions which were under my superintendence have reported houses in various localities to be in such an unhealthy state as to be quite unfit for human habitation; and as many of them are incapable of improvement, the only thing remaining to be done is to pull them down.”

HACKNEY.—The amount of damage done to house property in

* This is an enormous percentage, and exceeds, so far as I know, that in any part of London, among the inhabitants of an entire row or alley having an equal number of inhabitants. Some institutions, and of course single houses, have suffered more severely.

London owing to defective drainage, neglect, and filth, is a point of great importance as to the economical bearings of the sanitary question, and on which a large body of evidence might be adduced. The following is one illustration: in a newly erected street, Victoria-street, Hackney, the surface-water accumulates oftentimes so as to flow into the houses, the floors of which are below the level of the street:—

“Many of the houses at the time of the house-visitation were unoccupied on the ground-floor, in consequence of their being uninhabitable from the dampness thus caused: 60 cases of diarrhœa, 7 approaching cholera, and 3 deaths occurred in this street. At No. 11, with very bad drains and a full and offensive cesspool, the whole of the inhabitants, 11 in number, were suffering from diarrhœa.”

The following case is particularly instructive, inasmuch as it is one of those well-marked instances in which the operation of a deleterious agent is unequivocally demonstrated:—

“Silkmill-row,” says Dr. Gavin, “contains 14 houses, 2 of which are empty, and in the other 12 are 85 inhabitants. Owing to the nuisance caused by the privies emptying their contents into what was formerly the milldam-head, these were pulled down in August last and cesspools were made. The first cesspool was sunk in the middle of July, within one yard of the only well which, with the exception of one house, supplies all the inhabitants with water. Three other cesspools were made at the distances of 3, 5, and 12 yards from this well. About a fortnight or three weeks after the first cesspool had been made, the inhabitants observed the water become tainted and offensive; it gradually became worse until, when I saw it, that fresh drawn in the morning was as thick as thin soup, with feculent matter. The landlord’s agent employed himself an hour every morning in pumping off the thickened water in order to fit it for consumption and use. After his morning’s work he declared the water to be quite good enough for the inhabitants. Those who do not choose to drink and cook with this most foul water are compelled to catch the surface water which flows along the kennel from the road and neighbouring field. This water, which at other times would be considered foul, appears pure when compared with that used by the unfortunate inhabitants of this place.”

A table is given in the Report showing, in reference to this row, the following results: “Of 85 inhabitants, 2 having a separate spring, and 20 not then drinking the foul water, but using that of the kennel, were free from diarrhœa; of the remaining 63, all except the landlord’s agent and his wife, who do not use the water, and 2 others, suffered from diarrhœa, 46 cases of which, and one approaching cholera, were discovered and treated by the medical visitor.”

WESTMINSTER.—Dr. Waller Lewis, the medical inspector of several of the western parishes, and to whose Report I am indebted for much valuable information, states that a great many fatal cases occurred in this parish. Its present population is estimated at 62,881. During the four months ending October 20 there were 425 deaths from cholera alone, being at the rate of 2 per cent. per annum from one disease. Dr. Lewis adds—

“Any one conversant with the state of many parts of this low, dirty, overcrowded district, would be at no loss to account for this mortality.”

One of the visitors says of Pump-court,—

"Inspected the lower rooms of the houses; nothing can describe the beastly state of this place. The inhabitants would not permit us to go up stairs. One of the neighbours, from a more decent part of the court, said he could not state how many persons sleep in the houses at the top, but believes as many as 50 or 60 in a room: 'sees' large numbers turn out in the morning;' Irish wakes and all sorts of horrors are carried on."

Dr. *Lewis* reports, however, that the authorities

"had done much of late towards removing some of the worst nuisances in the poorer parts of the parish.

"Mr. Rogers, the solicitor to the Board of Guardians, gives me the following account of what has been accomplished during the last 12 months:—

"450 cesspools emptied.
142 drains cleansed.
42 accumulations of filth removed.
430 pigs disposed of.
162 houses thoroughly whitewashed."

The same gentleman states his belief that there is not a single pig in the parish at the present time. Magistrates' orders have been universally obtained for their removal, and as universally acted on—a striking contrast to the want of energy shown in some other parishes in regard to this species of nuisance.

SHOREDITCH.—This parish suffered severely from the epidemic, and, as in all other instances, certain definite localities experienced the full force of the pestilence. Thus in Windmill-square the mortality, although happily limited as to numbers, was, relatively, frightful, half the inhabitants having perished. The following is Dr. *Gavin's* history of this visitation:—

"Windmill-square consists of 5 houses in a small square; a stable and cow-shed and 2 small houses occupy one side—three similar houses the opposite side of the square; 22 persons inhabited these 5 houses. In a few days 11 of these persons died of cholera:—of 1 adult inhabitant, at No. 1, 1 died; of 5 inhabitants at No. 2, a child died; of 7 inhabitants at No. 3, the mother and 3 children died; of 5 inhabitants at No. 4, the mother and 2 children died; of 4 inhabitants at No. 5, the mother and son: the deaths followed in rapid succession.

"Now, the supply of water to these 5 houses is from a pump, originally sunk 18 feet; but on the formation of the sewer it was sunk to 24 feet, as if to insure the reception of the water percolating from it. Near the centre of the small square of 50 feet a cesspool was dug to receive the surface-drainage of the houses, and to relieve the cesspools of the fluid matters; also, to receive the drainage from an adjoining stable. Within a few feet of the pump a hole had been dug to receive water to water the square, laid out as a garden. Into this hole decaying vegetable matter had been thrown, and was accumulated. Moreover, the soakage from a large heap of manure—the refuse from the stable and cow-shed which occupies the place of No. 1, and which had been accumulated and piled up at the end of the roadway and in front of No. 1—not more than 25 feet from the well—passed into the well. (This refuse has been since removed.) The adjacent road is badly drained; and a cesspool under the grating in the centre serves to retain much foetid refuse; doubtless the drainage and fluid contents of this cesspool percolated through the soil and found their way to the well, which is the lowest level. It is impossible to stand close to this pump without perceiving a nauseous and offensive smell arising from it. There is no doubt that the state of the water, holding as it did organic matter in solution, was the

remote cause of the heavy mortality which swept away, in a few days, one-half the inhabitants of the square."

Union-street, between the Hackney-road and Kingsland-road, holds the next place; 10 deaths from cholera took place here, and 190 cases of diarrhoea and 4 cases of cholera were discovered by the visitors:—

"The street is one of the filthiest in the parish; the roadway the most broken up, so that stagnant mud covers its surface the greatest part of the year. It is altogether in a condition incompatible with healthy existence."

One district of the parish, consisting of the old part of Shoreditch, namely, "Shoreditch proper, and its continuation, the High-street, Shoreditch," together with the streets and alleys leading out of the main thoroughfare, was so pre-eminently distinguished as to create general alarm in that quarter of the metropolis; and the case is the more instructive, inasmuch as the families of many respectable shop-keepers suffered, proving that it was not dependent on distress of any kind. I myself saw eight or ten shops closed at one time in the main street, almost within a stone's throw of each other. Dr. *Gavin*, in his Report, says,—

"In this small space, forming a mere fractional part of the parish, about one-twelfth portion of the inhabited part, more than one-fourth of the total mortality (exclusive of that which occurred in the workhouse, the lunatic asylum, and the refuge for the destitute) which occurred in the parish took place.* The causes which, from my investigations, chiefly led to this excessive mortality may be referred not to overcrowding alone, because there are many other parts of the metropolis, and even of the parish, as densely populated; not simply to want of drainage (there is the strongest proof that the regurgitation of the contents of the sewers along the house-drains into the cellars of the houses in the main streets was a chief predisposing cause in numerous instances to the death of parties whose condition and habits of life were those of the respectable middle class); but to the concentration of malaria through the great amount of decomposing animal and vegetable matter which abounds in this locality. It is impossible to believe, passing through this main street, that so great an amount of filth, refuse, and foul matters, should be found in and around the dwellings; that so great a number of pigsties, bone-boilerries, dog-and-cat's-meat-manufactories, and tallow-melting establishments on the large scale, and so great a number of small dealers in animal and vegetable matters on the meanest scale, should exist in a densely crowded and closely built locality. The noxious trades and occupations which so greatly abound here exerted a most deleterious influence upon the health of the inhabitants. This is proven by the fact that, wherever such disgusting and offensive preparation of putrifying animal matters was carried on, cholera carried off its victims in the immediate vicinity. The inhabitants themselves were so thoroughly impressed with a sense of the danger arising from the unrestricted toleration of such pest-breeding nuisances, that they were most earnest in their entreaties that effective means of relief should be employed or devised to free them from the danger to which they were constantly exposed; the total immunity possessed by the owners of such public and grievous nuisances was complained of as a gross neglect, on the part of the General Board of

* The deaths in the district referred to amounted to 188; the total deaths in the parish being 723.

Health or the Government, of the interests of the public. It is scarcely necessary to add that there is no law to deal with such noxious influences."

KENSINGTON.—“*The Potteries.*”—One of the most deplorable spots in the metropolis, the mortality in which during the late epidemic was very high, is a place called “the Potteries,” situate in the important parish of Kensington, the circumstances connected with which illustrate so many of the existing sanitary evils, and the almost insurmountable difficulties that in the present state of the law oppose their removal, as to demand in this Report special attention. The awful mortality and sickness afflicting the inhabitants of the Potteries, and the causes inducing it, have attracted the special notice of all the medical officers of this parish. Mr. Frost, who is the medical officer of the district, has drawn up a most valuable Report on the subject, from which the principal facts about to be stated are derived. At Christmas, 1848, the population of the Potteries was 1056; it is now decreased, from death and other causes, to something between 900 and 1000:—

“During the three years ending December 31, 1848,” says Dr. Lewis in his Report on Kensington, “there were 78 deaths, or 26 in 1000; of these 61 were under 5 years; the average duration of life for those 3 years was 11 years and 7 months. In the first four months of 1848 there were 42 cases of smallpox in the Notting-hill district, the poorer part of the population of which amounts to about 5107; of these cases two-thirds occurred in the small locality of the Potteries, which thus suffered between nine and ten times more from smallpox than the rest of the district. In the first 10 months of 1849 there have been 50 deaths among, at most, 1000 persons: this is at the rate of 6 per cent. per annum, an enormous mortality. Of these 21 were from cholera and diarrhœa, and 29 from typhus fever and other causes. In 3 months (1848-49) Mr. Frost, the medical officer, attended 32 cases of fever, that is at the rate of 128 cases in a year among 1000 persons. It is illustrative of the common points between cholera and other zymotic diseases, that the former appeared not only in the same streets, in the same houses, but in the same rooms, that have been again and again visited by typhus. Mr. Frost pointed out rooms where three or four persons had recovered from fever in the spring, to fall victims to cholera in the summer. Nearly all the inhabitants look sallow and unhealthy; the women especially complain of sickness and want of appetite; their eyes are sunk, and their skin frequently much shrivelled. The eyes of the children glisten with unnatural moisture, as if stimulated by ammonia.”

In the above extract is revealed an amount of sickness and death which may be equalled, but can scarcely be exceeded by any part of England. A deep sensation was excited in the public mind when, in the course of the sanitary inquiries a few years ago, it became known that the mean age at death among the operatives of Manchester and Liverpool was only 15 or 16 years, whilst that of the gentry in the same town was 43 years, thus showing that the former lost 28 years of existence, for the most part owing to removable causes of disease. But here, in one of the richest parishes in London, surrounded by splendid villas and streets, is a population of 1000, among whom for the period of three years the average age at death was 11 years and 7 months, whilst of the total deaths the enormous proportion of 67·5 per cent. were below the age of 5 years.

Causes of this excessive Mortality.—All who are acquainted with

the laws of disease would at once infer that, to produce such an amount of sickness and death, there must be some most deleterious agents at work; the following details afford the explanation. In March, 1849, Mr. Lovick, who, by direction of the Commissioners of Sewers, examined the Potteries, stated that no fewer than 3000 pigs were kept in them. Dr. Lewis mentions another source of pollution arising from the boiling of fat—an operation which the Inspector of Nuisances states taints the atmosphere for half a mile round. Water is supplied to but a small part of the tenements, though the occupation of the people requires evidently a very large quantity of this element; a few wells have been sunk, but in many cases they have become useless from the organic matter soaking into them:—

"Stagnant water, disgusting to see, but still worse to smell, is found at every turn; in the streets, in the courts, in the alleys, and in the yards, not a drop of clean water—all is charged with organic matter. The paint on the window-frames, &c., originally white lead, had in a few months become in almost every situation black from the action of the sulphuretted hydrogen generated in all directions around."

One large stagnant piece of water is called "*the Ocean;*" and when I inspected this place by direction of the Board of Health, I found it covered with a filthy slime, and bubbling with the poisonous gases, caused by the drainage of pigsties and privies flowing into it. On the very border of this pond is placed St. James's National School, with about 130 children, whose health is reported to have seriously suffered. Many of the dwellings are mere hovels, with privies and sties close to them. That there should be such an extreme of physical degradation—which, it is affirmed, as to dirt, filth, and misery, is unsurpassed by anything known in Ireland—without a corresponding moral abasement, would be all but impossible; it is not, therefore, surprising that Dr. Lewis should remark that—

"The manners of the people are more uncivilized and rough than I have observed in other parts of the metropolis. A woman, living in a hovel more than usually dirty and offensive, pointed to a pig which her only daughter had brought up by hand: the poor child had died of cholera."

Repeated attempts have been made to remove the swine, which are the essential cause of all this misery. The medical officers of Kensington parish—Mr. Frost, Mr. Godrich, and Mr. Guazzaroni—much to their credit, and amidst great discouragement, have made several communications to the Board of Guardians, showing the sacrifice of life that directly results from this huge nuisance. The Board of Health instructed me to inspect the place; and a second examination was made by Dr. Milroy. I attended the Board of Guardians, among whose number is the owner of a part of the property, and urged upon them the necessity of the immediate removal of the pigs. Some steps were taken, and an order for the removal of the swine was made by the magistrate; but, notwithstanding various efforts on the part of the Board of Health and of the medical officers, this order has never been enforced, and at the present time (February, 1850) the pigs still remain, although diminished in number, and with them all the evil attendants described above. The medical officer states that, notwithstanding there has been a great diminution of the population, so that it must now be considerably less than 1000, the

cases of sickness in the Potteries are as numerous as in the remaining part of the district with a poor population of 4051.

Beneficial Results from Sanitary Measures.—It is the more remarkable that the local authorities of Kensington should thus neglect to enforce the law in a case affecting the health and lives of so many persons, since, in the same neighbourhood, a most striking example of the beneficial results following the removal of precisely the same source of mischief has occurred. Camden-place was occupied in 1848 by a similar class of pig-fatteners, 23 of whom were summoned before the magistrate at the Hammersmith police-court, who ordered the pigs to be removed, allowing two months for that purpose. The majority of the people complied, but some refused; one of these was fined 10s. a day till the nuisance was removed, and, after a fine of 2*l.* had been incurred, the animals were taken away. This amelioration was effected before the cholera, which produced such dire results in the Potteries, had broken out in this part of the metropolis: the results, which were most striking, are thus stated by Dr. *Lewis* in his Report:—

“ During the first ten months of that year (1848), with a population of 518, there were in Camden-place eight deaths, while, after the removal of the pigs, and the consequent cleansing of the street, with a population increased to 532, there was but one death in the corresponding ten months of 1849, although a most fatal epidemic has been superadded to other ordinary causes of mortality.”

Evil not confined to the Potteries.—Before closing this notice of “the Potteries,” it is proper to point out what, to medical men, and indeed to all disinterested persons, must be obvious, that it is not alone the wretched inhabitants of the place itself that have suffered from the state of things above described; but also persons living at a considerable distance, as the following statement, contained in Dr. *Lewis*’s Report, distinctly proves:—

“ Some 1200 or 1300 feet off is situated a row of clean, respectable houses, called Crafter-terrace, Latimer-road; the situation, though rather low, is clear and airy. On Saturday and Sunday, the 8th and 9th of September, 1849, the inhabitants complained of an intolerable stench, the N.E. wind blowing directly upon the terrace from the Potteries. Till this time there had been no case of cholera among the inhabitants. The next day the disease broke out violently, and on the following day, the 11th, a child died at No. 1; on the 12th a person died at No. 2; on the 13th one died at No. 5, and another at No. 7; on the 14th, another child at No. 1; on the 15th, a second child at No. 5; and on the 22nd, an adult at No. 9.”

Although there cannot be given demonstrative evidence to prove that this severe outbreak was directly induced by the poisonous effluvia, a large number of facts induce me to concur entirely in the opinion of the medical officer. Violent and sudden outbreaks of choleraic diarrhœa, affecting simultaneously large numbers of persons, as will be shown in the section on the predisposing causes, came to my knowledge during the late epidemic, in which it was certain that the sole exciting cause was the exposure to putrid animal effluvia. In the present instance the poisonous exhalations were distinctly perceived at Crafter-terrace; and it is well known that places at the distance of

half a mile from an active focus, like the one in question, are liable to be affected injuriously by effluvia wafted by the wind.

LAMBETH.—There are various circumstances which have co-operated to give force to the epidemic influence in this part of the metropolis. Many of the streets, owing to the low marshy character of the southern parts of the Thames, are built on swampy ground, demanding consequently all the appliances of art and science in respect of efficient drainage to render them a safe abode for human beings. But so far from this being the case, there are large tracts of open stagnant ditches in various parts of the parish. The water-supply is most defective as to quantity and quality; numerous instances of the evils consequent on which were reported in the progress of the epidemic. In a special Report by Dr. Gavin on the district “Waterloo-road, Second part,” where the mortality was excessive, it is stated that the water supplied by the Lambeth Waterworks was in some of the courts quite muddy, bearing no appearance of having been filtered, and “having a fetid smell and replete with insects.” In some of the courts 70 or 80 persons were dependent on one tap, without any cistern, and that situated in many instances near a privy, the gases emanating from which had a most deleterious effect upon the water. The supply is thus so limited that “a very active scramble occurs to secure the precious fluid,” which, as at the place called “The Apollo,” with 51 houses, and where 12 fatal cases of cholera occurred, flows only for about 30 minutes daily. In a limited locality comprising five streets, and included between two ditches extending from the Westminster to the Waterloo road, and open nearly throughout their entire course, 42 persons died of cholera, a great number experienced severe attacks, and it is believed there was scarcely a house in which the inmates did not suffer from diarrhœa. Grove-place, James’s-street, is a dirty, confined locality, and in it three fatal cases of cholera and many of diarrhœa occurred: in the first house in this place eight out of its eleven occupants were attacked with cholera, and two died; the house is badly ventilated and out of repair, whilst in the back kitchen is a deep pit, receiving the soil from a privy, and sending forth a stench quite overpowering:—

“A more dangerous nuisance could scarcely exist, and would long since have been removed, had the district been under the inspection of an officer of health.”

Many instances of the mischievous effects caused by the use of tainted water occurred in other parts of the parish, of which the following, mentioned by Mr. *Smyth*, one of the medical officers, is an example:—

“In many of the courts about Lower Fore-street, where cholera prevailed to a great extent, there is no supply of water. In Windmill-court he saw one of the most severe and well-marked cases of cholera he had witnessed; and a second case having occurred in the same court, his attention was attracted to the pump which supplied the court. On examining the water he found it was discoloured, and was so foul that it stank at a distance of the contents of a cesspool. In this court most malignant scarlet fever, with sloughing of the integument, and very bad typhus fever, have occurred; all these evils he is of opinion may have depended on the foul state of the water; and having represented this to the authorities, the Inspector of Nuisances removed the piston of the pump.”

In Lambeth, owing to the number of houses which have been pulled down in Westminster and other parts for the recent alterations, it has happened that there has been a great influx of Irish and other labourers, who, as no additional provision was made for them, necessarily caused a great overcrowding of the miserable domiciles, already overfull. This circumstance has attracted the attention of the local authorities as an additional evil: thus Mr. *G. Sutton*, Inspector under the Lambeth Improvement Act, states that—

“There are now more Irish than he has ever known; in a house in Broad-street he has known 24 Irish lodging at one time—there being three bed-rooms and small attic.”

There are also in the most densely populated parts of this parish several bone-boiling establishments, which, in a disease like cholera, must, by their poisonous effluvia, have greatly exasperated the late epidemic.

As I have already presented a special Report on this subject to the General Board of Health, it will suffice to state that, according to Dr. *King*, one of the medical inspectors of this parish—

“The deaths from cholera and the cases of diarrhœa have been very numerous in the districts around the bone-boiling establishments, few of the poor people escaping.”

Up to the 14th of September, 1849, 300 cases of diarrhœa, all of which were successfully treated, were reported as having been discovered by the visitors in this locality. Dr. *King* says—

“On coming within a quarter of a mile of the premises, the visitor is perfectly nauseated with the rank effluvia proceeding from the bone-boiling; and if the sickness and feeling of illness experienced by a casual visitor be any criterion, the surrounding population living on the spot must be fearfully predisposed to attacks of cholera.”

The streets near the river are subject to a special evil, owing to the flooding from the Thames, which takes place several times yearly. Mr. *G. Sutton* states in evidence that on these occasions—

“the water which is driven up through the sewers forces out a quantity of offensive matter, the privies are often overflowed; this has happened in his own cellar, the water rising to 5 and 7 feet; there is usually 2 or 3 inches of deposit left which has a bad stink, because the fact is, that the soil comes up from the privy; his walls have never been dry for 15 years, and so they can never lime-wash the lower rooms.”

On one of my visits I witnessed this phenomenon in Fore-street, the water having flowed up through the privy into the small yard, and thence into the back part of the house. Mr. Fall, formerly vice-chairman of the Board of Guardians, states that on these occasions the poor suffer greatly, their bedding being damaged from this foul stream thus penetrating into their living-rooms. The relieving officer of this district says,—

“There is a considerable amount of sickness; low fever, measles, small-pox, scarlet fever, and consumption prevail, and in consequence a large expense is incurred for relief.”

In Broad-street, which has, according to Mr. *G. Sutton*, who resides in it, only eight houses, seven deaths from cholera are reported. It is stated by the same witness the rent is considerably reduced owing to

the damage caused by the tide ; his rent has been lowered from 25*l.* 4*s.* to 15*l.*, but, "it would have answered his purpose better to have paid the original rent," if this great nuisance had been remedied.

ROTHERHITHE.—In the parish of Rotherhithe one influential circumstance which operated to raise the mortality higher proportionally than any other district in London, was evidently the noxious quality of the water used for domestic purposes. The evidence of Mr. *Chandler*, the medical officer of this parish, who had the superintendence of the measures adopted to meet the epidemic, and who himself saw about 600 cases of cholera and 3000 of diarrhœa, places this evil state of things in a strong light. After the cholera had shown itself lightly for several months by isolated attacks, at the end of June there was a sudden and violent outbreak.

"The disease began on the last day of June in a certain street, and in 16 houses 20 cases occurred. All these houses were supplied by one well, the water of which was derived from the Thames, and was moreover expressly ascertained to be contaminated by infiltration from a foul open ditch. Several of the persons who died were decent mechanics, and not in destitute circumstances. In another street with about 25 houses, each having on an average two families, and where the epidemic was very severe, 15 deaths at least having occurred, the water was likewise very bad ; in fact, it was taken out of the ditches communicating with the river, and which ditches received the matter from the privies."

Mr. *Chandler* says, in connexion with these circumstances—

"As to the influence of bad water, his opinion is, that in some instances it decidedly acted as a predisposing cause, and tended to the spread of the disease."

The Rev. *G. Blick*, rector of Rotherhithe, and chairman of the Board of Guardians, and who rendered most valuable services to the suffering poor, says,—

"he was constantly occupied in aiding with the guardians in the preventive measures during the height of the epidemic ; observed in some cases where the disease had been very severe, and where the water was tainted, that, on supplying pure water and having a medical man in constant attendance, the cholera was controlled to a marvellous extent, few cases occurring subsequently. Is convinced from the facts that came to his knowledge that the bad quality of the water in certain localities acted most prejudicially as a predisposing cause, and led to the spread of the disease."

With respect to this case of Rotherhithe, the fact of the people in the first street mentioned having been the earliest victims on the great outbreak, shows that they must have been highly predisposed ; and as they lived in decent houses and were in comfortable circumstances, two of the more ordinary causes of the disease, overcrowding and poverty, could not have operated. These considerations can leave no doubt that the one main cause of the great severity of the attack was the use for domestic purposes of Thames water, further polluted by sewer matter, into which privies emptied their contents.

ST. PANCRAS.—Although this district, collectively, suffered but slightly, the mortality being in the ratio of 3 in 1000, yet in certain localities the attacks were most virulent ; and as some of these localities were in the close vicinity of the model "Metropolitan Buildings,"

which, as will presently appear, entirely escaped, it is desirable briefly to glance at the epidemic in St. Pancras. In Paradise-place, a few hundred yards from the model establishment, according to the medical officer, Mr. Eascott, three fatal cases occurred in one house, and evidently owing to its wretched sanitary state. The family lived in a room over a very filthy stable; the floor was full of openings, so as readily to allow the foul effluvium to pass through. Besides this nuisance there was a heap at the door, consisting of horse-dung and putrid fish. Cholera also occurred in Adden-place, leading out of Paradise-place, and from this court the medical officer sent four cases of typhus to the Fever Hospital in the spring of 1849. There is a pigsty at each end of Paradise-place, and the supply of water is from a well and very insufficient in quantity. Mr. Popham states, that in a street in his district, in which the houses are very crowded, the drainage very bad, and the people unhealthy, five cases of cholera occurred in one house. The occupants of the kitchen-floor in a part of this district complained that, owing to the horrible stench from the drains, they could not shut the windows at night. In several of the houses in this parish all the inhabitants were affected with severe diarrhoea.

ST. MARYLEBONE.—Many parts of this parish are in a most defective sanitary state, of which the following are a few examples. Mr. *Buxton*, resident surgeon of the Western General Dispensary, states, in a very valuable Report with which he has favoured me, that—

“Tooton-court, Crawford-street, a low and filthy place, full of dungheaps, stables, &c., suffered very greatly, three cases having proved fatal. Devonshire-place is a close court, consisting of high houses, with the drains in a bad state: 10 or 12 cases of cholera occurred here, of which six or seven were fatal; five cases took place at No. 16, where the smell from the drains was almost unbearable.”

Mr. Buxton adds, the persons suffered intensely who live over stables and cowhouses, of which there are so many in the mews of this parish, and which, owing to many fashionable families having quitted, have been converted into dwellings. There is another class of tenements in this parish, extensively populated, which exert a most pernicious influence over the health of their inmates, and which will be noticed in a future page.

HIGHGATE AND HAMPSTEAD.—In tracing the influence of locality over epidemic diseases, the most instructive information is to be obtained from the investigation of those instances where, in the midst of a district otherwise distinguished by its healthfulness, severe attacks occur; inasmuch as in such cases it is obvious that there must be some extremely limited, well-defined, and consequently discoverable morbid causes in operation. Several such instances, both as regards fever and cholera, have come under my notice; and it may be affirmed a careful investigation has shown that, in all, the influential conditions related to places and not persons. During the late epidemic, the villages of Highgate and Hampstead, which are celebrated among the inhabitants of London for their healthy and bracing atmosphere, were particularly distinguished as being almost entirely exempt; in each there was, however, a circumscribed but severe attack, the circumstances connected with which were investigated by Dr. Milroy, from whose valuable

Report the following details are principally derived. In Highgate, with a population of about 3000 inhabitants, six cases of cholera occurred, all among the members of one family, living in two adjoining houses; the history of these cases is so instructive in various points of view, as to justify a somewhat detailed account. The first case was that of the wife of a thriving drover; this woman had had diarrhoea for 2 or 3 days, but had neglected it; she was seized on August 27, 1849, with all the symptoms of malignant cholera very soon after having eaten freely of eels for dinner: she died at 2 p.m. on the following day. On the morning of the 28th one of the sons was attacked with severe vomiting, purging, and cramps; he gradually recovered. The father was taken ill on the morning of September 3rd; but nevertheless he went to Smithfield market, where he became so much worse that it was necessary to convey him home immediately; the symptoms yielded to treatment, but fever set in and he died on the 6th. The fourth case was that of the sister of the first woman, who lived in the adjacent house and had assisted in nursing the sick; she was attacked on the 4th and died on the 7th. As she was dying, the drover's daughter, who resided with this aunt, was suddenly taken ill and died on the 12th; she had waited on her father and mother during their illness. The sixth and last case occurred in the son of the drover; he gradually recovered.

These cases, on the face of them, would appear to favour the idea of human contagion; but the following circumstances afford another and it is believed a more true explanation of this melancholy visitation. The two houses in question are situated in a place called Swain's-lane, which had long been notorious among the inhabitants as being, from its many nuisances, the most offensive spot in Highgate; moreover the worst of these nuisances were concentrated in the upper part of the lane closely adjoining the two houses:—

“On one side is a large cow-shed, where an immense accumulation of dung is often collected, polluting the atmosphere all round to a considerable distance; the drainage from this dung-yard, as well as from several privies, is conveyed underground to an open drain or channel on the opposite side of the lane, down which it runs for several hundred yards immediately in front of a row of small houses. The stench from this sewer is so disgusting that none of the respectable inhabitants of Highgate hardly ever pass along the lane, and even the visitors of the adjoining cemetery avoid that part of the ground which is nearest to it. Whenever any epidemic disease exists in Highgate, the medical gentlemen assure me that it is invariably most prevalent and severe among the inmates of the houses in the lane; and so confident was Mr. Moger that if the cholera visited Highgate it would make its appearance in this particular locality, that he made repeated complaints last summer to the Board of Guardians of St. Pancras respecting the unwholesome state of Swain's-lane.”

A local sanitary committee was appointed some months prior to the fatal attack, and the very first object to which they directed their attention was the state of this Swain's-lane; repeated representations were made to the guardians of St. Pancras, but without avail. Application was also made to the magistrate at Marylebone to have the nuisance corrected, but with no better result.

“But, besides the general insalubrity of the locality from the causes now mentioned, there was, in the back yard of the house where the first cases

occurred, a foul overflowing privy immediately facing and within a few feet of the back door. The stench from this was horrible, Mr. Moger says, especially at night, when he had to remain some time in the room with his patients, while the disgusting effluvium from the filthy cow-shed opposite quite sickened him as he approached the house. With so polluted an atmosphere continually around them during a period of epidemic sickness, no one can be surprised that the cholera found them out, and produced such fatal results in one family."

Instance of Hampstead.—In the district of Hampstead, with a population of 10,093, nine deaths from cholera were returned by the Registrar-General; of which one was imported, being that of the Rev. Mr. H——, who was one of the victims of the severe outbreak in Albion-terrace, Wandsworth-road; he came to Hampstead-heath on August 8, 1849, was seized next morning, and died in 8 hours. Of the few attacks originating in the village itself, no less than six, four of which were fatal, occurred in a family living in rooms over a stable, thus described by Dr. Milroy: at the stable door was a dungpit, which had not been emptied for some weeks; in the stable, in addition to the ordinary sources of impurity, there were 3 or 4 pits made to collect the urine of the animals and usually emptied twice a week; in the yard at the rear, and into which one or two windows looked, was a privy that stunk abominably, and within two or three yards of it a pigsty scarcely less offensive; the privy had been most injudiciously emptied out a day or two after the first death took place.

Another locality, where two fatal cases of cholera took place, was thus described by Mr. Lord in a pamphlet published in 1847:—

"The atmosphere from cesspool and drains is most loathsome. A painted chair which has been left on the ground room is blackened by the sulphuretted hydrogen escaping through the boards. A tame bird, which had lived a year in another house, died soon after being removed; the cat has died. Seven or eight cats have died there. 'Nobody can keep their cats alive there.' The man, a shoemaker, works at his trade, and smokes tobacco to disguise the smell. The rent is 5s. per week."

Instance of Albion-terrace, Wandsworth-road.—Dr. Milroy has given another important report relative to one of the most severe outbreaks of cholera that occurred in the metropolis, namely, that of Albion-terrace, Wandsworth-road. This place consists of 17 houses, letting for 50*l.* and 60*l.* a year, and having the appearance of commodious, comfortable dwellings; calculating seven persons to each house, the total population would amount to about 120 persons. The first case of cholera took place on July 28, 1849, at No. 13; and up to August 12, no fewer than 42 cases occurred, of which 30, or 71·4 per cent., proved fatal. It is evident that there must have been some unusual circumstances to explain this awful mortality; and the information obtained by Dr. Milroy shows very unequivocally what these circumstances were.

"About 200 yards in the rear of the Terrace is an open black ditch known as the 'sewer in Battersea fields,' and which receives the drainage from Clapham, Streatham, and Brixton Hill. The inmates of several of the houses complain of offensive effluvia perceived in their gardens behind when the wind sets in a particular direction. But it would seem that there is a source of foul exhalations much nearer the dwellings than this black ditch. In almost every house the servants complain of a stench in different parts of

the kitchen floor, and more especially over the sink in the back kitchen. This nuisance, always present to a greater or less degree, became much worse immediately after the heavy storm of rain on the 26th of July, and at the very same time the water was found to be not only muddy, but positively fetid, so that it was utterly unfit for use.

"Besides the effects of the late storm already noticed, a drain or sewer, which crosses the Wandsworth-road, and passes under No. 8, burst open on the evening of the 26th ult., and inundated the whole of the lower premises of that and of the adjoining house, No. 9, with its black and fetid contents. The cellars of these houses are still damp and offensive.

"There was another most pernicious source of insalubrity that is still more to be deplored, seeing that it might have been so easily prevented. I allude to an enormous accumulation of most offensive rubbish in a cellar of No. 13. It appears that this accumulation must have been going on for 18 months or a couple of years at least, as, when removed on the 30th or 31st ult., it amounted to seven or eight cartloads of what is described as a most disgusting compound, swarming with maggots and exhaling a putrid effluvium.

"It was at this house, No. 13, that the first case of the fatal disease occurred on the 28th of July, in one of the servants, who had been affected for a day or two previously with diarrhœa and had not attended to it. Her sister, who had come from the country to nurse her, was seized a few days afterwards and also died. Most of the members of the family were affected with diarrhœa; they had gone to the country and the house was deserted. About the same time, the disease began to manifest itself in other houses of the Terrace, and in many instances with terrible virulence. The entire household of No. 6 has been swept away."

The nature of the water-supply is very important. On this Dr. Milroy remarks—

"The whole of the underground arrangements for the supply of water to and the removal of the drainage from the houses was found to be most faulty and imperfect. The suspicion expressed in my former Report that the water-tanks or cisterns and the cesspools were in close proximity to each other, and that the water in the former had become contaminated with the contents of the latter after the heavy storm of rain on July 26, proved on examination to be correct."

Influence of Graveyards.—The influence exerted by graveyards in the development of cholera is intimately connected with the point under consideration; but a special Report having been already published by the General Board on the subject of extramural sepulture, it will not be necessary to refer to it in the present document. It may, however, be observed, that abundant evidence has been collected, especially by Dr. Milroy, to prove that in the metropolis the most offensive putrid effluvia escape from the burial-grounds; that these are predisposing causes of disease, and especially of fever, disturbance of the alimentary canal, and of various affections depending upon a poisoned condition of the blood, and that in the houses immediately adjoining these places cholera was observed to prevail. It is known that a most distinguished surgeon, whose valuable life fell a sacrifice to the late epidemic, resided in a house the back windows of which looked directly into a graveyard; that he was much in the habit of sitting at these windows when opened; that he had complained to his servant several times shortly before his attack of the offensive smell proceeding from the burial-ground, in which some cholera corpses had been interred; and that on the very day of the fatal seizure a grave had been dug which attracted his attention as having increased the noxious effluvia.

COMMON LODGING-HOUSES.—The enormously overcrowded and filthy condition of the common lodging-houses of London is well known to the parochial authorities, among whom, so far as I have made inquiries, there is a general wish that they should be improved, inasmuch as they are known to be a source of epidemic disease, as well as of every species of moral contamination.

ST. GEORGE'S, SOUTHWARK.—In the month of February, 1849, a severe attack of cholera occurred in two of the lodging-houses in the Mint, Southwark, in one of which four cases and two deaths occurred, and in consequence I inspected several of these places, and having on former occasions visited other establishments of the same kind, I am bound to state that I have witnessed scenes which no language can describe. The beds are placed in every possible direction, occupying not only the rooms, but the landings on the stairs and passages; the people are huddled together two, three, or more in a single bed, children often occupying the foot and the adults the top of the same bed. Many of the dormitories, as I saw in the Mint, had no fire-place, and even where this opening existed it was from ignorance closed up by boards, so that in many instances these rooms at night would be almost hermetically sealed; added to which, in several parts of London, there being no privies provided, the most bestial matters are accumulated. Some of the houses I examined professed to receive 100 lodgers, others 60. All this causes an oppressiveness and stench utterly insupportable to strangers and absolutely incompatible with health: and yet in these wretched abodes, where all ages and sexes commingle together, some families actually take up their residence as it were their home. I have seen married people with their children who said they had lived in the same house for two or more years. In the better conducted establishments the married couples have rooms allotted to them, but in others no such separation is attempted, all sleeping indifferently in the common dormitories.

WHITECHAPEL.—The following is a description of a low lodging-house in Parson's-court, Rosemary-lane, by Mr. *Straw*, a guardian of the Whitechapel Union, and an active member of one of the local sanitary committees:—

"I went at night to visit this house; the room I first entered was 12 feet square, in which I found 20 persons of both sexes and all ages lying on the floor;* in another room there were 14 more in the same state. I went into another room, but did not count the number, being overcome with the stench of the room and the scenes I had witnessed. Before returning home I went into another house of a similar description in Hogg's-court, Dock-street, and there witnessed the same disgusting and degrading sight. If Government knew the demoralised state of society in such neighbourhoods, I feel confident they would instantly take steps to improve it."

Mr. *Filliter*, a medical visitor, gives a similar description of lodging-houses in Wentworth-street, in the Whitechapel Union: in the attic of No. 69 he found 22 beds with scarcely any interval between them.

* This would give 86 cubic feet for each person, whereas, at the lowest calculation, 500 ought to be allowed: in barracks 800 cubic feet is the allowance for each soldier.

KENSINGTON.—The sanitary evils of Kensington are not confined to the Potteries, noticed in a preceding page. Dr. *Lewis* says,—

“But if the Notting-hill division of Kensington has its Potteries, the town division has its Jennings'-buildings and Hooper's-gardens. These consist of a large number of houses, in close narrow courts and alleys leading out of High-street, let by the owners to small shopkeepers and others, who underlet them to third parties; these again sublet them to tramps and others, who pay for a night's lodging. Threepence for a single man, and sixpence for a couple with a child or two, if a single bed only is occupied, is the usual charge. One room, 14 feet by 14, is occupied by four married couples; a back room, 15 feet by 19, is occupied by three married couples, and three single women; while the front room, through which they pass, contains a married couple and a single man. The rooms are, in almost every instance, unprovided with chimneys, or ventilation of any sort except a small square window; and this is often rendered almost useless for the admission of light and air, by a high wall running up parallel with and within a foot or 18 inches of it. I am informed that these buildings, and the culs-de-sac adjoining, form 'houses of refuge' for many of the worst characters in London.”

Of places like these, it may be affirmed that they are utterly incompatible with the maintenance of health; their unfortunate inmates are as surely, though it may be more slowly, poisoned, as if they had been shut up in the Black-hole of Calcutta. Jennings'-buildings was conspicuously distinguished by a severe outbreak of cholera in the early part of 1849; in consequence of which, in company with the Earl of Carlisle, I inspected the locality. The general results, as to preventible sickness, are thus given by Dr. *Lewis*:—

“During the last eight months, the total number of deaths have amounted, in a population of 750, to 33; of these, 20 were from cholera and diarrhœa. The entire mortality is, therefore, at the rate of 44 per thousand for that period, or 6·6 per cent., a frightful ratio.”

The economical part of the question ought not to be lost sight of:—

“Jennings'-buildings, though a source of considerable profit to the owners and other speculators in such houses, are the principal cause of the high poor-rate paid by the inhabitants of other parts of the parish, and which would undoubtedly be reduced but for this and some other smaller nests of pauper houses. During the raging of the epidemic, much cleansing and limewashing was done by the authorities, and many lives were doubtless saved by that means, when the disease broke out for the second time among these houses. But the 'buildings' are gradually reverting to their original condition.”

Special Evils of common Lodging-houses.—It is essential to point out that these common lodging-houses are not only, in all seasons, a cause of disease to their unhappy and neglected inmates, and of a heavy pecuniary loss to every parish where they exist; but they often prove a source of direct infection to the surrounding districts. It is well known to the parochial medical officers that they are a hotbed for fever of every kind, and often of a virulent and contagious nature. Having had occasion lately, by direction of the Board of Health, to institute some preliminary inquiries into the neglect of vaccination, and the consequent increase of small-pox, I have obtained evidence which shows that this latter disease is very frequently introduced among the permanent inhabitants of populous districts of the metropolis by unvaccinated

sojourners, and especially new comers from Ireland; who, taking up their temporary abode in these establishments, and becoming affected with the distemper, serve as so many active foci to light up this destructive and loathsome disease in the neighbouring localities. The same kind of evidence has been given me in some country towns, where it is found that small-pox is frequently introduced by tramps, wandering vagrants, and other inmates of these houses. This is a question of great importance, and it is so felt to be by medical men, and by the local authorities; since, whatever care is bestowed by them to guard the permanent population—for whose health they are more particularly responsible—from the ravages of small-pox by vaccination, the object is liable to be, and in fact is, constantly defeated by the introduction of unprotected persons into dwellings so well calculated to develop zymotic disease. If the importation of small-pox by unvaccinated new comers were prevented, as by proper legislative measures it could be, it is the opinion of competent judges that the disease would be reduced to very narrow limits, if not totally extirpated, in all localities where vaccination was universally and scientifically practised.

There is at present no efficient legal power to regulate common lodging-houses in the metropolis; for although some control is given by the Nuisances Removal Act to the guardians of the poor, as to cleansing operations, the prime evil of these places, overcrowding, is left untouched. As an indication of what might with proper regulations be effected, it may be stated, that when, upon my recommendation, in the month of March, 1849, the guardians of St. George's, Southwark, enforced in the lodging-houses in the Mint the imperfect sanitary precautions as to cleansing, &c., authorised by the above Act, so beneficial a change was wrought in them, that when cholera subsequently raged in the parish, in which no less than 112 deaths occurred in one week, so few cases took place among the numerous inmates of those crowded dwellings, as to excite the surprise of Mr. Rendle, the surgeon of the district.

MARYLEBONE.—Inhabited Cellars.—In connexion with the subject matter of the present section of my Report, a passing notice may be given to a class of dwellings the existence of which is probably known to few beyond their unhappy inmates and the officials whose duties call them to these places. I allude to the inhabited cellars of Marylebone. Owing to the increasing and urgent demand for house accommodation for the poor in every quarter of the metropolis, it has become the practice, in many decent and respectable streets in this parish, for the occupier to let off to separate families the under-ground kitchens, which, it must be understood, were originally never contemplated, as assuredly they are unfit, for human habitation. According to the medical evidence, “there is a large underground kitchen population.” I have myself examined some of these kitchens, as they are termed; and I am bound to say, that in construction and wretchedness they are more objectionable as dwellings than many of the cellars of Liverpool and Manchester, the use of which has been prohibited by the authorities of those towns. The following is an accurate description of one in Devonshire-street, Lisson-grove:—The depth below the level of the street, upwards of 6 feet; length, 9 feet 6 inches; width, 9 feet 3 inches; height, 5 feet 6 inches; one window, 3 feet 3 inches by 2 feet

5 inches; rent, 1s. 6d. In the small sunken area there was a drain, from which proceeded the foulest stench I think I have ever smelt; close to this drain was a water-butt, the contents of which must of necessity have become tainted by absorbing the noxious gases emitted.

In a very small sunk court behind, were a foul privy and heaps of refuse. In this kitchen, which in the broad daylight was so dark and gloomy that it looked like a cell, lived a man and his wife and five children; so that, as the cubic space equalled about 580 feet, the allowance to each person was about 83 cubic feet, or one-sixth of that which, at the lowest estimate for sleeping-rooms, is compatible with health. One of the children was ill from inflammation of the chest, the others looked sickly, whilst the mother of this unhappy family had been removed to the workhouse labouring under phthisis or consumption—a disease which depends more frequently on breathing a foul atmosphere than on any other one cause. With the light thus excluded, the air tainted, and the water poisoned, the vital forces are so reduced, that when any disease arises medicine loses its power. The children especially suffer from being more constantly immersed in the foul atmosphere, and from their powers of resistance being less; the pale lips of these poor sufferers has attracted the attention of the medical attendants.

Mr. *Palmer*, the late resident surgeon of the Western General Dispensary, says—

“He has a horror of these kitchens, in which disease prevails very much, especially among children; and when illness does occur, it is most difficult to treat.”

Mr. *Hetty*, a medical officer of Marylebone parish, states—

“He has seen a back kitchen with the beds so close, that there was scarcely room to walk; the windows are below the level, and small. There is much sickness; it is hopeless to treat any severe case in a kitchen; it is of no service to give medicine in fever and diarrhœa, they always go from bad to worse.”

The putrid atmosphere gives a virulence to disease unknown in more healthy localities. Thus, during the epidemic scarlet fever in this district of 1848, Mr. *Palmer* says he saw in the worst cases in these cellars what he had never witnessed but once before:—

“Mortification and sloughing of the skin covering the throat, sometimes extending almost from ear to ear. Saw as many as two or three dozen of such cases. Knows nothing of which he is more certain, than that they were caused by foul air and bad ventilation; in some of these instances there was no want of food.”

In corroboration of this assertion, this gentleman states there is such a vast difference in the same house between these cellar-kitchens and the rooms above them, that he has seen a most marked effect produced by merely removing a sick child into the garret:—

“He has again and again seen a striking improvement, the only change being from a dark and close to a light and more airy apartment, all other circumstances remaining the same.”

During the late epidemic, Mr. *Buxton*, the present house-surgeon of the Western General Dispensary, states that the inhabitants of these

kitchens suffered severely. There are similar underground dwellings in other parts of London, and, the causes being the same, the results correspond. Dr. *Lewis* thus notices the cellar dwellings of Kensington:—

“One great evil is the number of people lodging in underground rooms; in these rooms zymotic diseases of all kinds, especially small-pox, typhus, and measles, are invariably more fatal than in other parts of the same house. The lower the room, the more severe the disease: thus, any of these maladies is found to be more dangerous when occurring to a person living in the basement story, than to one inhabiting the ground floor; more so on the first floor than on the second floor, and so on.”

From this evidence, it is certain that a large annual sacrifice of human life is directly caused by these underground cellars; of which, according to Mr. Hetty, there are hundreds in Marylebone, and which call as loudly for efficient regulation or closure as those of Liverpool, where the local Act gives ample powers for this purpose.

There is a strong desire in various parishes to introduce sanitary improvements, but it too often happens either that the advocates of such ameliorations are in a minority, or that where more unanimity prevails, the present state of the law renders all effectual amendment impracticable. As an indication of these impediments, it may be stated, that in 1847 the guardians of Clerkenwell appointed a committee—

“To view and report upon the condition of such buildings, in the courts and other places in the parish, as might appear to be in a dangerous state, and also to call the district surveyor’s attention thereto; and to take such other measures as the committee might deem advisable for the public safety, or for abating any nuisances that might be found to exist in the localities referred to.”

Mr. *Liddle* states that the Report contains a faithful account of the deplorable condition of the poor localities; and that although many of the evils do not at this moment exist, nuisances of a frightful kind still abound in the parish, among the chief of which may be mentioned Fleet-ditch, which is uncovered for a considerable extent, and the noxious trades carried on in its vicinity. The houses, which in 1847 were reputed to be wholly unfit for habitation, still remain; although “the donkeys,” which inhabited the lower parts of the dwellings and shared the apartments with the inmates, have been removed. The following extract, from the Report of the committee, points to the defective state of the law, which thus, on the approach of a destructive epidemic, prevented the application of those measures which they deemed to be essential to the public safety:—

“Your committee also feel it incumbent upon them to draw attention to the fact, that unless some legislative measure be passed for the removal of the confined, damp, and unhealthy courts and alleys heretofore referred to, they will, doubtless, long continue to remain pest-houses, spreading disease among the surrounding neighbours; as, on inquiry, it appears that no law at present exists, which would prevent the rebuilding of such courts and alleys by the owners thereof in consequence of dilapidation, &c.; and while the law prohibits the building of such places in localities where they do not already exist, it appears to be inoperative as regards the places built before the passing of the Metropolitan Buildings Act, however unhealthy the locality may be, arising from its confined situation, and that absence of all means of ventilation and drainage.”

Progress of Cholera in the Barracks of the Metropolis.—The following Return, received from the Adjutant-General's Office, shows the progress of cholera as far as the troops quartered in the metropolis are concerned :—

RETURN of the Number of Soldiers in each of the Metropolitan Barracks at the time of the prevalence of Epidemic Cholera in the Metropolis last year ; and the number of cases of Choleraic Diarrhœa in each Barrack ; also of developed Cholera, and of Death from Cholera.

Regiments and Battalions.	Number of Soldiers in each Corps.	Number of Cases of		Number of Deaths.
		Diarrhœa.	Cholera.	
1st Life Guards, Hyde-park Barracks . .	404	None.	None.	None.
2nd Life Guards, Regent's-park Barracks .	385	150	8	4
Royal Horse Guards, Hyde-park Barracks .	342	22	12	6
Grenadier Guards :—				
1st Battalion, Portman-square and St. George's Barracks.	602	77	3	2
2nd Battalion, Wellington Barracks . .	478	43	2	2
3rd ditto ditto	536	19	..	..
Coldstream Guards :—				
1st Battalion, St. George's and St. John's Wood Barracks	618	37	4	2
2nd Battalion, the Tower	502	43	6	5
Scots Fusilier Guards :—				
1st Battalion, St. John's Wood and Portman-street Barracks	483	24	7	1
2nd Battalion, the Tower	523	50	27	5
Total	4873	465	69	27

(Signed) JOHN MACDONALD, A.-G.

I am indebted for the following facts to Mr. Gulliver, surgeon of the Royal Horse Guards. The 1st Life Guards left Hyde-park barracks for Windsor on July 1st, 1849, a time when the epidemic was just beginning to acquire force in London. On that day the Royal Horse Guards succeeded the above regiment at Hyde-park barracks, and on July 4th a fatal case of cholera occurred. The regiment was generally healthy till September 1st, when a case appeared in an airy room on the park side of the barracks. The disease increased quickly on this airy side of the barracks up to September 10th, when, on Mr. Gulliver's recommendation, the regiment marched to Canterbury. The beneficial effect of this procedure was most marked ; for whilst on the very day on which the troops marched, two cases occurred in the wives of two of the soldiers, who had been left behind, with the intention of following on the next day, and who were living in the part of the barracks above noticed, only one case of cholera took place subsequent to the removal, and this man, who had carried the germs of the disease with him, recovered.

It will be seen that the Horse Guards, being quartered in a district

in which several attacks of the epidemic occurred, suffered most severely, having lost nearly two per cent., there being 6 deaths out of 342 soldiers. The next in severity is the 2nd Life Guards, the mortality being rather more than one per cent.; and then the regiments of the Foot Guards quartered in the Tower, in which the deaths are rather less than one per cent., or 10 out of 1025. The total deaths among the 4873 troops are 27, or 5·5 in 1000; a proportion somewhat less than that of the whole metropolis, which is 6·6 deaths in 1000 inhabitants.

PRISONS OF THE METROPOLIS.—Taking the prisons of London collectively, the mortality from cholera exceeded that of the inhabitants generally, as will appear from the following statement:—

	Average Number of Prisoners.	Attacks of Cholera.	Deaths.
1. House of Correction, Coldbath-fields*	1,100	0	0
2. Model Prison, Pentonville	465	0	0
3. Giltspur-street Prison	247	0	0
4. Bridewell	90	0	0
5. Newgate	200	1	0
6. Horsemonger-lane Prison	228	1	1
7. House of Detention†	122	1	0
8. House of Correction, Westminster	800	42	13
9. Millbank Penitentiary	1,106	113	48
Total	4,358	158	62

The percentage of deaths to the whole number of prisoners is 1·4, whilst the proportion of deaths among the population generally is 1 in 151. As might probably have been expected from their low situation on the banks of the Thames, the Westminster House of Correction and the Penitentiary, Millbank, have principally suffered; in the former the mortality being 1·6 per cent., whilst in the latter it rises to 4·3 per cent. of the prisoners. If these two prisons be excepted, the mortality is extremely slight, there being only one death out of 2330 prisoners. A difference thus striking demands some inquiry into the probable causes that have led to it.

Millbank Prison.—It is well known that a considerable amount of sickness has in former years from time to time occurred among the prisoners; and it is important to observe, as indicative of the operation of some general cause or causes, that fever has prevailed. In reference to this subject, the Medical Superintendent, Dr. Baly, remarks,—

“The causes of the general liability of the prisoners to fever appear to be the low site of the prison, the proximity of low and ill-drained ground, open sewers and manufactories which fill the air with impurities; the construction of the building, which impedes the free circulation of air through

* One prisoner died here from cholera, but it evidently was an imported case, the man having been brought from a place where the disease prevailed, and being attacked on the night of his admission.

† Two imported cases occurred at this prison.

it, and the proneness to suffer from general causes of disease, which is produced by the state of imprisonment.”*

Previous to the appearance of cholera in England, there had been a great increase of disease generally, but especially of fever, among the male prisoners, the number of whom had also been considerably augmented, as appears from the following table :—

TABLE showing increase of Prisoners, Disease, and Mortality.

	1844.	1845.	1846.	1847.	15 Months ending 31st March, 1849.
Average Number of Male Prisoners	742·434	828·041	845·321	983·076	1207·146
Cases of Fever { Severe .	17	17	21	65	117
{ Slight .	24	18	42	51	231
Deaths from Fever . . .	3	4	3	7	18
Total Number of Deaths { from all causes . . . }	13	14	12	28	93

In reference to this increase of fever, after making allowance for the fact that fever was epidemic in London in 1847 and 1848, and for the causes above enumerated, connected with the site of the prison, &c., Dr. Baly remarks that the circumstances of the case would suggest the suspicion

“That in the summer and autumn of 1848 some special cause existed in the prison favourable to the spread of the disease there; and other facts seem to show that this cause was the increase of the number of prisoners in the establishment, and especially the accumulation of too large a number of prisoners in the large common rooms or wards of the prison.”

In corroboration of this inference a table is given, from which it appears that the number of prisoners, which had been on the average, for the first four months of 1848, 1081, was increased in May to 1364; that the average continued high (1350) until December, when it fell to 1031; and that, in the same way, the number of cases of fever, especially the severe and fatal cases, increased in June, and continued high till the end of December, when they greatly diminished. But more than this, when an inquiry was made as to the parts of the prison in which the greatest number of cases of fever occurred, it appeared—

“That the proportion of cases in the rooms where prisoners, on account of the crowded state of the prison, had been congregated in large numbers, was 26·75 per cent. during the seven months (May to November); and in the rest of the prison, where the prisoners were with few exceptions in separate cells, only 12·81 per cent. The proportion of deaths was also proportionably greater in the parts of the prison in which the prisoners were congregated in larger numbers.”

After stating that the number of prisoners was in consequence of these facts reduced, and that this was accompanied by a marked diminution in the attacks of fever, Dr. Baly observes—

* Millbank Prison, Sixth Report of the Inspectors, p. 6.

"There is every reason to believe, therefore, that the number of prisoners in the rooms and wards referred to had exceeded the limit which is compatible with the health of the prisoners ; and that the continued and increasing prevalence of fever in the summer and autumn of 1848 was due to this cause."*

It cannot, I conceive, be doubted that the crowded state of this prison, by lowering the powers of the system, tended to increase the attacks of cholera. But the other circumstances mentioned by Dr. Baly must have had a large share in producing the mortality, since it appears, from information furnished to me, that in the former epidemics of cholera the prison suffered severely.

	1832.	1833.	1834.
Number of Prisoners . . .	519	581	637
Deaths from Cholera . . .	17	5	9

The total deaths were thus 31, or 1·7 per cent. of the total prisoners.

The influence of overcrowding in connection with the spread of fever is most strikingly illustrated by the facts above detailed.

Note.—Since the above was written, I have had an opportunity of examining the Report of the Inspectors of Millbank Prison for the present year, 1850. In this document some very important evidence is given by Dr. Baly confirmatory of the correctness of the opinion that overcrowding, which it must always be borne in mind is the result not merely of an excess of numbers, but also of defective ventilation, was the most essential cause of the large mortality from cholera ; indeed I do not know an instance affording more demonstrative proof of the truth of the position advanced in the fifth section of the present Report, that "of all the causes which predispose to preventible disease, the most influential and deleterious is overcrowding." After alluding to the influence of numbers and defective ventilation on the spread of cholera in the prison, Dr. Baly observes,—

"The following facts, which tend to show that the proportional number of cases of cholera was greatly diminished, by reducing the number of prisoners in the establishment, have, consequently, an important bearing on the question of the cause of its prevalence in the prison.

"In the month of July, when the epidemic was becoming general and severe, it was deemed advisable to reduce the number of prisoners at Millbank, and on the 21st of that month a large body of male convicts were removed to Shorncliff barracks; and in the latter part of August a further number was removed. Those who remained were distributed through the five different pentagons ordinarily occupied by male prisoners. The number of female convicts in the female pentagon remained the same as before. The comparative prevalence of cholera, and the mortality from it, amongst the male and female convicts respectively, before and after the reduction in the number of the former class of prisoners, are shown in the subjoined table, together with the mortality at the same periods in London :—

	June and July.	Aug. and Sept.
Number of deaths from Cholera in London .	2189	10,896
Mortality per 1000 of population in London .	0.9	4.5
Number of female convicts in Millbank Prison .	120	131
Mortality per 1000 from Cholera amongst the female convicts	8.3	53.4
Cases per 1000 amongst the female convicts .	16.6	61.0
Number of male convicts in Millbank Prison .	1039	402
Mortality per 1000 from Cholera amongst the male convicts	23.1	9.9
Cases per 1000 amongst the male convicts . .	53.9	37.3

“It will be seen that while in the metropolis generally the mortality from cholera was five-fold greater in August and September than in June and July, and while an equal increase took place in the mortality amongst the female convicts in the Millbank prison, the mortality and the number of cases of the disease among the male convicts underwent an extraordinary diminution; and it cannot but be admitted as at least highly probable, that this favourable alteration was the result of the diminished number of the male prisoners in the parts of the establishment occupied by them.”

A marked benefit was also produced by the reduction as regarded fever, so that

“the cases of fever, and the number of deaths from the disease, became even proportionally less numerous from the time of the reduction in the number of the prisoners at the end of November, 1848; and no cases of a severe character, except three imported cases from Ipswich, occurred during the months of August, September, October, and November, 1849, when the number of prisoners was reduced so low by the removal of a large portion of them to Shorncliff.”

House of Correction, Westminster.—This prison suffered most severely after the Millbank Penitentiary, the deaths amounting to 13 in 800 prisoners, 1.6 per cent., or more than double the mortality of the metropolis. From a statement for which I am indebted to J. Lavies, Esq., the medical attendant, it is shown that in the six years 1844-49 there were 10 deaths from fever, or, assuming the average of the prisoners to be 800, 1.2 per cent. for the whole period. In the same time the deaths from all causes amounted to 68, 8.5 per cent. for the six years, or 1.3 per cent. annually. In addition to the attacks of cholera, there was a large amount of diarrhœa, the cases being 471, all of which were successfully treated. Mr. Lavies remarks that the men suffered much more severely than the women; that in them there was no premonitory diarrhœa; that the dissipated, the destitute, and the drunkard were not the victims; the attacks occurring among persons in previous good health and of robust habit; and that several cases arose in one particular part of the building, the only discoverable cause for which was an open sewer on the outside of the prison. He adds—

“The sewer, upon my representation, in conjunction with Captain Williams, the Inspector of Prisons, was immediately covered in; and since the whole of our drainage is undergoing general revision and repair.”

House of Correction, Coldbath-fields.—The facts connected with

this prison are very interesting. It lies towards the north of the metropolis, and has the advantage of being on somewhat elevated ground; but the neighbourhood around is a very unhealthy one, as the prison is within a quarter of a mile of Saffron-hill and the courts in Gray's-inn-lane, where there were many deaths from cholera; it is also close to Spafields burial-ground. In this gaol, with 1100 prisoners, not a single case of cholera arose within the walls; nor was there much diarrhœa, and the cases that occurred were not severe and were easily checked. But in the epidemic of 1832-33, with about the same number of prisoners (in 1832 the number was 1148), the results were very different, as will appear from the following table:—

	Confirmed cases of Cholera.	Premonitory and Incipient Cases.	Total Number of both.	Total Number of Deaths.	Total Number Cured.
Male cases of Cholera in 1832 .	145	282	427	32	
Female " " .	56	19	75	11	
Male " 1833 .	6	18	24	2	
Female " " .	..	..	..	..
Total . . .	207	319	526	45	481

In 1832, according to information for which I am principally indebted to Mr. Chesterton, the governor, and to Mr. Wakefield, the surgeon of the prison, the drains were in a very defective state; so that, on examination, it was found that the sewers had in places fallen in; they were dry-built, without mortar, and consequently contained a quantity of soil. There were at that time water-closets, but the pans were made of iron, instead of earthenware as at present; and, owing to the defect of the drains, the contents were not carried off. Subsequently the whole of the sewerage was rebuilt on an improved principle, and, on being lately examined, was found to be in excellent order, great attention being paid to the subject. The diet of the prisoners is also better now than it was in 1832; and a small open fire has been placed in each of the day-rooms, which, in Mr. Chesterton's opinion, has operated beneficially, by preventing cold and dampness, at the same time that ventilation is promoted.

The officers at the prison informed me that since the above ameliorations the health of the prisoners is much improved, that the general mortality is diminished, and that fever is less severe than formerly. The returns with which I have been furnished corroborate, as far as they extend, the above statements; thus the annual average of deaths for the 6 years 1844-49 was only 9 with an average of 1000 prisoners, whilst in the 6 years 1826-31 the yearly average of deaths was 15. In the 6 years 1844-49 the deaths from fever were 5 in an average of 1035 prisoners, or a half per cent. for the whole time; whilst the total deaths in the same period amounted to 56, or 5.4 per cent.

Giltspur-street Prison and Newgate.—These prisons, situated in the very heart of the metropolis, and at no great distance from a district which suffered severely, experienced, the former a complete and the latter all but a complete exemption. This is the more striking,

since the inmates of these prisons, differing in this respect from those of the Houses of Correction, must have been more frequently renewed or taken out of the main mass of the population.

Bridewell Prison.—This prison presents an instructive example of the great benefits resulting from the application of judicious sanitary measures. It should be recollected that Bridewell is situated in a locality which suffered most severely in the late epidemic, so much so indeed as to have attracted public notice. The following particulars are taken from a report of Mr. H. C. Edwards:—

“Mr. Holme Coote, Assistant Surgeon to the prison, states, that the average number of prisoners during the years 1848 and 1849 was 90; that during the whole period very little sickness of any kind existed; and that, whilst the cholera raged on all sides of the prison in houses closely contiguous, only separated by a narrow court, not a single case of cholera occurred; this was the more remarkable as fresh prisoners were daily brought in, of the lowest class and in the greatest state of destitution and filth. Only one person (a turnkey) was attacked with diarrhœa (which easily succumbed to treatment), occasioned, in the opinion of Mr. Coote, by the party having been placed near a foul drain which was being cleansed. In the epidemic of 1832, 12 persons were attacked and 4 died, and there was at that time and previous thereto a considerable amount of sickness. This remarkable exemption from cholera, of the Bridewell, Mr. Coote and the Governor attribute to the very different sanitary arrangements of the prison. In 1832 the prison was in a most filthy state: the dirt on the walls, instead of being washed off, was merely covered with a coating of lime-wash, so that when a thorough purification *did take place* the walls were found coated to the depth of two inches. In 1832 three prisoners occupied a cell, there was a deficiency of medical superintendence, and neither personal cleanliness nor proper ventilation was sufficiently attended to. To these causes was attributed the mortality, and the medical inspector, Mr. Nicholl, is stated to have said ‘that he should have been surprised if the prison had escaped.’ So dissatisfied were the authorities with the then arrangements, that the whole of the staff of officers were dismissed.

“Since that period, however, a vast alteration has taken place. The prison is kept beautifully clean, personal cleanliness is strictly enforced, only one inmate is allowed in a cell, proper and wholesome food is supplied, and the prisoners are under rigid medical superintendence. A more striking instance of the beneficial effects of proper sanitary arrangements Mr. Coote is of opinion could not be found. On examining the medical books of the prison, it was remarkable how very little any of the inmates seem to have suffered from sickness of any kind. Some few cases of fever appeared about two years ago, but these arose in persons who were affected before entering the prison.”

Model Prison, Pentonville.—This prison having been constructed specially on sanitary principles, the statistics of disease assume, as in the case of the model lodging-houses, a greater interest. It has been seen that, with an average of 465 prisoners, no death occurred from the epidemic. But further, it will appear from the following statement, for which I am indebted to C. Bradley, Esq., the resident surgeon, that, as regards those diseases which serve as an unerring standard to test the healthiness or unhealthiness of a locality or establishment, the Model Prison is most favourably distinguished. Taking a period of 7 years, that is, from the opening of the prison to December 31, 1849, the following are the results:—

Average number of prisoners	395
Total cases of fever for the 7 years	9
Dysentery	0
Diarrhœa	2
Erysipelas	0
Smallpox	1
Deaths from the above diseases (fever)	1
Total deaths from all causes in the 7 years	20

It is necessary to explain that the return only includes the severe cases of diarrhœa, “slighter cases of relaxation of the bowels, requiring an astringent dose or chalk mixture,” and which are not unfrequent, being omitted. Further, it should be stated that prisoners labouring under diseases which endanger life, and not likely to recover in the prison, receive pardons, a circumstance which will of course affect the mortality; in the above period, for instance, two men suffering from diarrhœa were discharged, one of whom would probably have died. No pardons on medical grounds were granted in the seven years for fever, dysentery, or erysipelas. After making the necessary allowance on this ground, which will have little influence on the zymotic class of diseases, the results are most marked, and, as in every instance without an exception that has come to my knowledge, demonstrate the supreme importance of sanitary principles.

Lunatic Asylums.—There are in the Metropolitan District, which includes a distance of about seven miles, about forty-six licensed asylums, in which, on January 1, 1849, the numbers were as follows:—

Men	1363
Women	1774
<hr/>	
Total	3137

This is exclusive of the public establishments, such as Bethlem and Hanwell. The Commissioners in Lunacy have obtained returns from all the establishments in which cholera occurred; the results of which, as to numbers, are shown in the table at page 71.

These returns, including 2570 lunatics out of 3137, thus show that there have been more or less severe attacks of cholera in most of the larger private establishments, and that the mortality has been very high as compared with the metropolis, the percentage of deaths to the total inmates ranging from 1·8 to 13·6, the average being 6·4. In comparing these asylums—all of which (excepting that of St. Marylebone, which has only paupers) receive private and pauper patients—with each other, it will be found that the relative mortality corresponds to a considerable extent with the relative mortality of the several districts of the metropolis: thus Bethnal-green and Camberwell districts, containing the asylums of Bethnal-green, Peckham House, and Camberwell, which suffered the most, stand considerably higher in the mortality table (see p. 40) than Marylebone and St. Luke's, where are situate the asylums of the same name. The largest establishments, including Grove Hall, Bow, where dysentery was so fatal, have on the whole suffered more severely than the smaller ones, with the marked exception of Althorpe House. It appears from the returns, that in all instances increased attention had been paid to the drainage, flushing.

	Inmates.			Cholera.						Diarrhoea.			Dysentery.			
	Male.	Female.	Total.	Attacks.		Deaths.		Recoveries.		Percentage of Deaths to Total Inmates.	Attacks.	Deaths.	Recoveries.	Attacks.	Deaths.	Recoveries.
				Male.	Female.	Male.	Female.	Male.	Female.							
1. St. Luke's.	92	123	215	4	6	3	1	1	5	1.8	67	..	67	..	..	..
2. Grove Hall, Bow* . . .	144	253	407	4	22	3	8	1	14	2.7	88	2	86	119	27	92
3. Hoxton House	160	259	419	7	33	3	18	4	15	5.	21	..	21	..	..	..
4. St. Marylebone Asylum .	26	47	73	4	..	4	..	..	..	5.	2	..	2	..	..	..
5. Camberwell House . . .	133	195	328	11	12	10	8	1	4	5.4	14	4	10	..	..	..
6. Cowper House, Old Brompton . . . . .	..	..	33	4	..	3	..	1	..	9.	..	..	..	..	..	..
7. Peckham House	184	282	466	34	56	19	24	15	32	9.2	140	6	134	..	..	..
8. Bethnal-green	267	318	585	20	42	18	38	2	4	9.5	..	..	..	..	..	..
9. Althorpe House, Battersea	16	28	44	3	5	3	3	..	2	13.6	10	1	9	..	..	..
Total	1,022	1,515	2,570	91	176	66	100	25	76	6.4	342	13	329	119	27	92

Percentage of deaths to attacks, 62.1.

* In the return from this establishment it is stated, in reference to the large mortality from dysentery, that most of the fatal cases occurred in old, debilitated, and paralytic patients.

and the removal of refuse, &c. The diet was, in almost every case, likewise improved.

Public Asylums.—Bethlem Hospital.—This is a public lunatic asylum, situated in the parish of St. George the Martyr, but on the verge of Lambeth parish. It contains, on an average, about 200 men and 200 women. According to a statement with which I have been favoured by Dr. Wood, the resident medical officer, not a single case of cholera occurred among the inmates during the late epidemic. In the end of July, 1849, there was a rather severe attack of diarrhœa, but no case was fatal. This hospital experienced a similar exemption in 1832. Cholera prevailed extensively around the institution, and within a stone's throw several severe outbreaks of the disease occurred—a circumstance which makes the exemption more remarkable. The establishment is surrounded by a large open space; there are no privies nor cesspools; the water is supplied exclusively from a deep well on the premises; and to this Dr. Wood is inclined to attribute importance. The diet was not altered during the epidemic. There is very little low fever among the patients.

In connection with this institution the following interesting facts were communicated to me. Some years ago a particular gallery attracted the attention of the authorities, in consequence of the inmates suffering from fever and diarrhœa. This was the more unexpected, because the gallery was one of the most favourably situated in the whole establishment; it was lofty, very airy, and not at all crowded, and the patients were of the healthiest class. Upon examination it was ascertained, that owing to some defect in the water-closet, a leakage of the soil had taken place beneath the floor. This was corrected; the sickness ceased, and this gallery has ever since continued as healthy as any part of the institution.

Middlesex County Asylum, Hanwell.—This fine institution is situated in the open country, about seven miles from London. The average number of patients during 1849 was as follows:—

Males	.	.	.	.	.	.	.	408
Females	.	.	.	.	.	.	.	553
Total								961

According to a letter received from one of the resident medical officers, Dr. Hitchman, not a single case of cholera occurred, either among the inmates or among the numerous attendants. But the epidemic gave unmistakable evidence of its influence; 140 females having suffered from diarrhœa during the months of July, August, and September, all of whom speedily recovered by taking each a small quantity of brandy with twenty minims of Battley's sedative solution of opium. The epidemic nature of the affection was indicated, particularly in one instance, in which, on the night of August 5th, seventeen female patients and one nurse, all belonging to one ward, were attacked with diarrhœa, attended in some of the cases by great exhaustion. The male patients were very slightly affected, only six patients and two attendants having been attacked in the above period. Dr. Hitchman adds, that on the female side of the institution, of which he is the medical attendant, no case of fever has occurred since his appointment

(four years), and that he finds no record of any attack for a much longer period.

Remarks.—It is remarkable that whilst so many private asylums have suffered, and some seriously, from the epidemic, the two large public institutions of Bethlem and Hanwell, containing together 1361 patients, besides attendants, entirely escaped. It is not from this to be inferred that the attack in the one instance, and the exemption in the other, have been owing to the private or public character of the establishments; several of the private asylums in the metropolis having escaped, whilst public institutions elsewhere have suffered. A very fatal outbreak occurred for instance at the West-Riding Pauper Lunatic Asylum, Wakefield, as the following facts extracted from the Reports of the medical officers to the visiting magistrates will show:—

	Number of Patients.	Diarrhœa.		Dysentery.		Cholera.			Remaining Cases.
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Recoveries.	
Males . .	296	41	0	6	5	63	49	6	8
Females .	324	83	0	7	1	55	36	6	13
Total . .	620	124	0	13	6	118	85	12	21

The above table relates to the month of October, 1849; it appears that one other death occurred from cholera, making the total deaths from the attack 86.

I was myself a witness of a severe outbreak of cholera in a large public asylum at Glasgow.

Without making special investigation into the exact state of each establishment, it is impossible to offer any definite opinion respecting the attacks in the several metropolitan asylums; but I may state that in some institutions which I did visit during the prevalence of the epidemic, offensive effluvia escaped from the closets and urinaries, a circumstance which, so far as I have observed, is most prejudicial during the presence of cholera, since diarrhœa and dysentery are particularly liable to occur among persons exposed to a privy atmosphere. In all cases in which large numbers are collected together, and especially in the case of paupers, prisoners, and lunatics, it is essential that the water-closets and urinaries should be perfectly inodorous, a condition which by proper arrangements and precautions can be secured.

Progress of Cholera in Workhouses.—The Board of Health, having, in the months of January and February, 1849, instituted a special inquiry into the sanitary state of the several workhouses of the metropolis, and into their capabilities for the reception of persons affected with cholera,* was desirous of obtaining an accurate statement of the num-

* Report on thirty-eight Metropolitan Workhouses, by Dr. Arthur Farre, and R. D. Grainger, Esq., printed by order of the House of Commons.

ber of inmates in each house who had been attacked either with cholera or diarrhœa; together with other illustrative details respecting the number of widows and orphans who had become chargeable on the rates, owing to deaths from the epidemic; the total expense thus incurred, &c. A Return was ordered to be made of these particulars by the House of Commons; but so few replies have up to the present time been received, that it is impossible to give any general statement relative to details which in so many different ways affect the public interests. In the absence of this information, and having received from the medical inspectors accounts of only a limited number of these establishments, the duties of those gentlemen relating to another object, it has not appeared to me desirable, with such imperfect data, to enter at this time upon so important a question. I may, however, remark that sufficient is known to show that where the sanitary arrangements were defective the epidemic prevailed, and in some instances very severely; and that, as regards the expenses thrown upon the ratepayers, owing especially to the large number of widows and orphans left by the victims of the disease, they will be seriously felt, and that for years to come.

Before closing this section, it may be proper to remark, that an attempt was made to ascertain the force of the epidemic among the shipping on the river, but without success; since, although a vessel was provided for the reception of sailors, many of those who were attacked were conveyed elsewhere or died on board. Many persons working on the river, such as lightermen, boatmen, ballast-getters, &c., died, most of the cases appearing in the returns from the registrars' districts which border on the Thames.

SECTION IV.

Exemptions from the Epidemic, and Results of Sanitary Improvements.

Controllable Character of Epidemics.—It is a remarkable fact that those diseases which by their destructive violence, their sudden assaults, and their wide range, seem to break through all barriers and to bid defiance to all control—which among barbarous nations are regarded as manifestations of the Divine anger, as they are, even among the most civilized people, sometimes held to be the appointed means for checking what is falsely termed an excess of population—constitute precisely the class which, when their laws are thoroughly comprehended, are found to be most observant of limitations and most amenable to human influence. The plague has yielded before the advance of western civilization; and even where, by that combination of prejudice and ignorance which in all nations so powerfully impedes the progress of the human family, it is permitted to remain, it spares the cleanly and enlightened and takes its victims out of the abodes of filth and apathy. The intermittent and remittent forms of fever, which when they operate in all their intensity may kill almost on the instant, or more slowly

with a whole population, as is seen in the Pontine marshes, have, in a multitude of instances, been eradicated by the perfecting of agriculture; whilst, as regards the typhoid or low fevers, they also select their proper habitat, and invariably diminish as sanitary improvements progress. With respect to the more specific or eruptive fevers, as scarlatina and measles, they only flourish, as to the rule, amidst the filthy and neglected dwellings of the poor, where they acquire a malignity which gives them almost a new character; while, as to small-pox, the most loathsome of the class, a perfect preventive, according to excellent authorities, has been granted to mankind in the great discovery of Jenner, though, owing to defective arrangements and prejudices, never yet realised.*

Exemptions.—In the course of the late epidemic several instances of exemptions from its attacks, partial or complete, occurred. Some of these were particularly instructive, inasmuch as they concerned large groups or classes of people, living in the midst of cities which were severely visited, and who, notwithstanding this circumstance, and that they mingled freely with the general population, were yet so fortunate as wholly or in part to escape.

Instance at Berlin.—One of the most interesting of these examples is the following, which happened at Berlin during the severe epidemic of 1848, and for the details of which I am principally indebted to Dr. Wald, one of the physicians of the splendid new hospital called the Bethanien. The authorities of Berlin gave employment, at the time in question, to a body of about 6000 men, inhabitants of the city, and of various trades and callings—artisans, mechanics, and labourers. They were employed in repairing the Charlottenburg canal, which is situated in the open country, though only a short distance outside the walls. They worked very hard, and were absent from their homes fifteen or sixteen hours daily, returning every night to sleep: they resided in all quarters of the city. It was a matter of general remark, that, whilst the general population suffered severely, of this large and mixed body of workmen, according to the most careful inquiries, only eight were attacked. Now, here were 6000 men, of diverse occupations, ages, and constitutions, who almost entirely escaped; and as their families did not enjoy any particular immunity, their exemption cannot be explained by anything peculiar in this respect. They lived better than usual; but this circumstance, although important, will not account for the very small number of attacks. The common tenor of all similar exemptions, as well as the general principles of sanitary science,

* As a proof of the lamentable neglect of vaccination it may be stated, that, having been instructed by the Board of Health to visit Windsor in November last owing to an attack of small-pox, it was discovered, in carrying out the preventive measures I recommended, that there were in a population of about 8000 so many unprotected persons that the medical officers in three weeks vaccinated 506 persons, and to these must be added those vaccinated at the Royal Dispensary and by private practitioners. And yet in this town the guardians of the poor had anxiously exerted themselves to promote vaccination, having, in addition to issuing annually placards calling on the people to send their children to the surgeon, raised the fee paid to their medical officer from 1s. 6d. to 2s. 6d. for each case. In the year 1848 the births in England amounted to 504,227; of these only 167,042, or 33 per cent., were vaccinated under the direction of the guardians; and when to this number are added those vaccinated at the expense of their parents, it is certain that large numbers must have been left unprotected.

exclude any other conclusion than this—that these men, being withdrawn, for nearly two-thirds of every twenty-four hours, from the foul atmosphere of the streets and places in which the labouring classes reside, and which are in all respects in a most unfavourable condition as regards health, thereby were enabled to resist the epidemic influence, to which the members of their families succumbed, like the rest of the population.

Instance of Hamburg.—The town of Hamburg, owing to the destruction of nearly one-third part by the great fire of 1842, affords a striking illustration of the supreme importance of sanitary principles in the spread of epidemic disease. The rebuilding of this large portion of the city was intrusted by the authorities to Mr. Lindley, civil engineer, who, carrying out, as far as circumstances would permit, the principles developed in the Sanitary Report of Mr. Chadwick, has substituted wide, open, and airy streets, for narrow, filthy, and damp thoroughfares; he has replaced offensive privies by water-closets; he has introduced into every house an ample and cheap supply of water at high pressure; whilst, by an admirable system of sewers, and by turning a portion of the waters of the Alster river into them, and thus preventing any deposits, so that the bricks are as clean now as when first laid down seven years ago, he has secured to the inhabitants the inestimable advantage of efficient drainage without any of its penalties. These vast improvements, which, although they are imperfect in some respects, are yet up to this time unrivalled in Europe, have been productive of most marked improvements in the public health, so far as the rebuilt part of the city is concerned. All the medical men with whom I conversed coincided in the statement, that, during the epidemic of 1848, the severity of the cholera in the new quarter, although still occupied as before by numbers of the labouring classes, was much below that of 1832.

Experience of London.—I may premise the notice about to be taken of some of the principal exemptions which occurred in the metropolis, by observing, that, having carefully gone over the whole of the evidence collected by the medical inspectors; having well weighed a large number of facts communicated to me in a series of years by practitioners of all classes, residing both in town and country; and having also considered all the various circumstances that have fallen directly under my own observation, I feel myself justified in stating, that in no one instance has a well-matured plan of sanitary amelioration failed in the great object of all these proceedings—the diminution of sickness, suffering, and death, and the consequent promotion of human happiness. Whether the amelioration consisted in removing a damp and foul evaporating surface by flagging a court, or in promoting the free circulation of air by widening streets and exposing narrow alleys to the renovating influence of the direct rays of the sun, or in the substitution of water-closets for pestilential privies, or in the provision of a pure and ample water-supply, in each and every instance disease, and especially zymotic disease, has decreased, and life has been prolonged. To this statement I know not a single exception. In the preceding section, several instances, indicative of the beneficial influence of sanitary improvements, have incidentally been mentioned: others will now be adduced.

Model Lodging-houses and Buildings.—Among the illustrations of the position here asserted, none are of such a special and instructive character as those furnished by the various model establishments provided for the labouring classes. The circumstances which, in regard to the present investigation, give such peculiar interest to these institutions, are, firstly, that they were, by their beneficent and enlightened founders, erected for the express purpose of testing and demonstrating, in addition to the social bearings of the question, the direct influence of structural arrangements and sanitary precautions in mitigating the ravages of disease; that these buildings receive labourers and artisans of various occupations; that persons, of all ages, from the infant at the breast to aged widows, are received; and that the establishments are situated in diverse quarters of the metropolis, and several of them in the very lowest and unhealthiest districts.

“Society for the Improvement of the Condition of the Labouring Classes.”—I am indebted to Mr. Wood, the secretary, and to Mr. Berry, the surgeon of this institution, for the following facts:—

The several houses, situated as stated below, have rarely beds unoccupied, so that the number of inmates may be estimated from the beds.

		Number of Beds.
FOR SINGLE MEN.	{ George-street, Bloomsbury . . .	104
	{ Charles-street, Drury-lane . . .	83
	{ King-street, Drury-lane	24
FOR FAMILIES.	{ Model Buildings, consisting of twenty-three houses	54
FOR AGED FEMALES.—	One house	30
Total beds and inmates		295

With respect to the last two establishments, situated near the Lower Pentonville-road, Mr. Wood states, the inmates entirely escaped. All the other houses, as Mr. Berry reports, are situated in densely-populated districts.

“In the first, or George-street establishment, there were 10 or 11 cases of diarrhœa, and one attack of cholera, and this in an old man aged 70, of intemperate habits, and who rarely tasted animal food. The house in Charles-street had but two cases of diarrhœa; and that in King-street, probably the most crowded locality of all, escaped entirely both cholera and diarrhœa.”

Medicine was left with the housekeeper, and the inmates generally were, by Mr. Berry’s directions, warned that they could receive medicine on making application on the first symptoms of diarrhœa showing themselves. It thus appears that, out of 295 persons, 13 cases of diarrhœa and 1 case of cholera occurred.

“Metropolitan Buildings.”—This important establishment, consisting of a large mass of buildings let out as separate tenements to families, is situated in Old Pancras-road. On September 6, 1839, when I visited the establishment, there were 500 inmates, of whom 350 were children. Up to that date, when cholera and diarrhœa were raging in the metropolis, there had been only seven cases of diarrhœa

and not a single case of cholera, nor did any attack of the epidemic subsequently occur.*

It thus appears that, out of a total of 795 inhabitants, only 20 have suffered from diarrhœa and 1 from cholera. But fully to appreciate the vast influence thus exerted by sanitary measures over the most destructive epidemic known, it must be recollected that these model establishments are situated in districts where the cholera extensively prevailed. One of them is in St. Giles's, two are in Drury-lane, whilst, as regards the "Metropolitan Buildings," although the locality is more open, the immediate neighbourhood suffered severely. Thus, at the distance of 300 or 400 yards is Paradise-place, in St. Pancras parish, and already noticed as the spot where, in one house, three fatal cases of cholera occurred. As a further proof of the unhealthiness of this district, I may mention that, on visiting the Model Buildings, I saw what it had never happened to me but once before to witness—in St. Pancras-road the gully-holes stopped up to prevent the escape of the foul effluvia, which were stated by the inhabitants to be most offensive.

Owing to the slow progress of sanitary improvements in the metropolis, but few instances of marked and decided benefits consequent upon their introduction can be adduced: indeed, with the exception of the several model establishments, I do not know a single part of London, inhabited by the poor, in which the main predisposing causes of disease

* The late epidemic brought before the public eye a fact well known to those who have considered the subject—the large pecuniary sacrifice inflicted in various ways on the community by preventible disease. It was the desire of the General Board to have brought out this truth in all its bearings, by showing the amount of parochial expenditure incurred for medical attendance, widowhood, and orphanage during the late epidemic. As these returns have not yet been furnished, one or two illustrative instances only can be given; but they have a general application. The two cases of the Model Buildings, Pancras-road, and of Peahen-court, in the city of London, may be contrasted with each other. The former has a population of 500; no case of cholera occurred, and only 7 cases of diarrhœa, all of which recovered; there were no deaths, and consequently no widows or orphans were left; little or no expense was incurred for medical advice; there was no outlay for funerals; and there was no loss of wages. The population of Peahen-court was, when I inspected it, about 150; at the time of the cholera there was one small stand-cock for the supply of water; the cellars were half full of ashes, dirt, and decaying animal and vegetable matter; in each house was a privy, and, a barrel-drain having been carried below the privies into the main sewer, and there being neither traps to prevent the escape of the sewer air, nor water to flush the drain, a foul stench was produced in each dwelling; a severe outbreak of cholera occurred, seven persons having died; the heads of two families were cut off, and in a few days 12 orphans were thrown on the parish. From an estimate furnished to me by the clerk of a populous union, as to average cost of each pauper orphan, it appears that from this one court, with less than one-third of the population of the Model Buildings, a public loss amounting to 420*l.* has been unnecessarily incurred. In the parish of Lambeth, according to an official statement, 270 orphans and 62 widows had become chargeable owing to deaths from cholera; and to these must be added 19 men who, in consequence of the deaths of their wives, were compelled to apply for parochial relief. Some idea of the burden thus cast on the ratepayers of Lambeth may be formed from the estimated expenditure in the preceding instance.

After the attack of cholera, Peahen-court was greatly improved; each house was provided with a cistern for water and with a properly trapped watercloset; and I have been informed on competent authority that, with their comfort, the health of the inhabitants "is strikingly improved." Previous to the epidemic, there had always been in this court a prevalence of low fever.

—overcrowding, privies, filth, defective water-supply, drainage, and ventilation—have all been removed. In different districts some of the evils have been corrected, and, as already remarked, always with corresponding benefits.

Islington Parish.—Mr. Pearce, the medical officer of the most populous and poorest district of Islington parish, states that

“The trustees of the poor, being anxious to improve the sanitary state of the parish, directed all the courts to be flagged and lighted; they also appointed five inspectors of nuisances. Some notion of the former state of the courts where the Irish lived may be gathered from the fact that, owing to the overflowing of privies, want of pavement, &c., the people were obliged to place bricks for the surgeon to step on to avoid the filth; the stench also was insufferable.”

Since these improvements were effected, now about a year, Mr. Pearce

“has observed a marked decrease of disease, especially of fever; the only diseases in the Irish courts being at present a few cases of measles and bronchitis.”

But the most important result was, that in this, formerly the most miserable and sickly part of the district, the inhabitants suffered much less from the late epidemic than any other portion of Mr. Pearce's division of the parish. Thus, this gentleman had in all 62 cases of cholera and 900 of diarrhœa, from July 5 to October 11; of these, only 12 cases of cholera and 70 of diarrhœa occurred in the Irish courts; whereas, calculating the population, there ought to have been 16 cases of cholera and 225 of diarrhœa. Mr. Pearce justly observes—

“I think it is impossible that any more powerful proof of the efficiency of sanitary improvements can be adduced than that those crowded, filthy Irish courts, which at one time were the hot-beds of fever and erysipelas, have suffered very little during the late epidemic; and I think he must be determined to be sceptical, who can attribute this to any other cause than the vigorous sanitary precautions adopted and fully carried out by the trustees of this parish.”

St. Olave's, Southwark.—Similar but not such marked benefits have followed the plan of flagging the courts in St. Olave's union. Mr. Bayfield, one of the medical officers, states that he had observed a decrease of disease in such courts; and Mr. O'Connor, a scripture reader, says that this is one of the greatest improvements, since it prevents the accumulation of filth, and keeps the surface dry. He adds,—

“Has observed that there has been less fever and sickness in those places which have been flagged, and also less bowel complaints among the children and young persons.”

Bethnal-green.—An important instance is adduced by Dr. Gavin of the marked diminution of disease and death, in a place called Old Castle-street, the owners of which, especially of the south side, have effected considerable improvements, by providing a good supply of water, drainage, &c. The result has been that, whereas before these ameliorations, namely in 1847, fever and other zymotic diseases prevailed, subsequently the medical officer, Mr. West, states that he has now no disease to attend to in the improved houses. As regards cholera,

Results of Improvements.

it was observed that this street suffered much less than three adjoining streets, although previous to the improvements the mortality and sickness from zymotic diseases were higher; the results are shown in the appended tables:—

BEFORE IMPROVEMENTS (1847).

	Deaths from Fever.	Deaths from Zymotic Disease.	Cases of Fever.	Cases of Zymotic Diseases.
Old Castle-street .	1	5	1	14
Old Nichol-street .	2	..	6	7
New Nichol-street .	..	2	9	10
Half Nichol-street .	..	2	8	12

AFTER IMPROVEMENTS (1849).

	Deaths from Cholera.	Deaths from Diarrhœa.	Cases of Cholera.	Cases approaching Cholera.	Cases of Diarrhœa.
Old Castle-street .	10	1	12	3	80
Old Nichol-street .	35	0	17	10	197
New Nichol-street .	23	2	30	15	135
Half Nichol-street .	25	2	20	5	152

“Had the deaths in Old Castle-street been in proportion to the mortality of 1847, in place of being 11 they would have been 49; had the choleraic cases been in the same proportion, in place of being 95 they would have been about 169; 38 cases of fatal cholera and 74 cases of choleraic disease may be calculated as having been prevented by the improvements.”

Whitechapel.—Mr. Liddle, in his valuable Report, adduces several proofs of the direct benefit that has followed the introduction of sanitary measures. The following example may be selected as well illustrating some of the most important points bearing on the amelioration of the dwellings of the poor:—

“Gower’s-place, Goodman’s-fields, is a *cul-de-sac*, consisting of 16 houses. Here cholera extensively prevailed in the winter of 1848-49, 8 cases having occurred in three of these houses. The first case happened in the house adjoining a filthy and overflowing privy, and within two days 7 of the inmates in the adjoining two houses were attacked, 6 of whom died. On the occurrence of these cases the parochial officers (of Whitechapel) applied themselves to the abatement of nuisances, and the more frequent and effectual cleansing of this court and the houses in it; the privy was emptied; the house where the disease appeared was cleared of its inmates, whitewashed, and thoroughly cleansed; the court was also regularly washed down daily with the fire-engine and hose. Not a single death from cholera has taken place in this court since the return of the epidemic in June last.”

To the concluding part of this case I am particularly anxious to call attention. Mr. Liddle continues,—

"The sanitary condition of this court (the property having recently changed hands) is now carefully looked after in person by the present landlord. He has the privy cleansed daily; the court washed frequently and properly repaired; and he is now about erecting a large tank, so as to afford the inhabitants a constant supply of water; and for this improved supply the tenants have cheerfully consented to pay an additional penny per week."

Exemptions in Public Institutions.—The exemption of many well-managed public establishments, situated in the midst of the metropolis, is instructive, as showing how effectually the most destructive epidemic can be controlled. Thus, Mr. Stone, the surgeon of Christ's Hospital, informed me, that, among about 1000 boys belonging to the London establishment, there was not a single case of cholera. There were, however—which is important as showing the actual presence of the disease—many cases of diarrhoea, frequently combined with vomiting; all of which, by prompt treatment, were cured.

Prisons and Lunatic Asylums.—In the account of the progress of the epidemic in the prisons and lunatic asylums of the metropolis, several instances of exemptions are given.

Hospitals.—Some facts relating to the results of improved sanitary conditions in hospitals have come to my knowledge; and which seem to be of sufficient interest to notice in this place, although some of them are only indirectly connected with cholera.

St. Bartholomew's Hospital.—It has been stated in a previous page, that no fewer than 478 cases of cholera were admitted into some detached wards at this hospital. The average number of the ordinary patients is 500, and there are upwards of 100 female attendants; out of this large number not a single case of cholera occurred. Great attention is paid to the sanitary state of the establishment; and in the year preceding the late epidemic, the sum of 2000*l.* was expended in improving the drainage of the hospital, which is now in a most efficient state.

New Wards at St. Thomas's Hospital.—An instructive example of the general benefits derived from improved construction is afforded by the new wards of St. Thomas's Hospital. The old buildings which occupied the place of the two fine wings, facing the main thoroughfare in the Borough, were low, confined, and dark; the new wards, six in number, are raised on a basement; they are lofty, light, spacious, and well ventilated. Since these wards have been opened, it has been remarked that erysipelas, a most obstinate and fatal disease in most hospitals, has much diminished, owing, as the medical officers are satisfied, to the improved sanitary condition of the new buildings. The resident medical officer, Mr. Whitfield, has also observed that there is less fever in these as compared with the old wards; and especially that the nurses suffer much less than in the latter. The mortality from cholera among the officers and inmates in 1832, when no cholera cases were admitted, was more severe than in 1849, although the latter epidemic was so much more severe than the former, and cholera patients were admitted. Great attention has of late years been paid by the authorities to the drainage of the hospital, and to sanitary improvement generally; and to these circumstances the comparative exemption just noticed ought probably to be attributed.

Middlesex Hospital.—Great improvements have been of late years effected in this establishment by the construction of new wards, im-

proved ventilation, &c. The results are thus described by the resident medical officer, Mr. Corfe :—

“ There has undoubtedly been a more rapid and general improvement in the convalescence of patients since the introduction of the ventilating shafts, new windows, &c.—in fact, since the new hospital has been opened—compared with the progress of the sick to convalescence in the former building. For instance, there have been one, two, and at the most five cases of erysipelas in the wards, where we formerly numbered 12 or 16 ; it has been especially observed that there have been no cases breaking out in the wards of any severity ; and those which did occur, perhaps 15 in the last nine months, have done well. The improvement in the statistics of erysipelas is most striking and peculiar. We have had no case of fever breaking out.”

Exemption of the Jews.—Among the instances of exemption, one of the most remarkable is that of the Jews, who, in London, as in Liverpool, &c., have suffered very slightly. The following details relating to this point are extracted from Mr. Liddle’s Report :—

“ It is a well-ascertained fact that the Jews residing in London have suffered less in proportion to the population than the other inhabitants. It is reckoned that there are about 20,000 Jews in the metropolis. The number of Portuguese Jews is about 3000, and up to the 13th September only two cases of death from cholera had occurred among them. Not a single case of cholera happened in the Portuguese Jews’ Hospital in the Mile End-road. In the year 1832 only 4 deaths from cholera occurred among this section of the Jews. The above facts are recorded on the information kindly furnished to me by Mr. S. Aselnino, the secretary of the Portuguese synagogue in Bevis Marks.”

Mr. Liddle, having received further information from the secretaries of the great synagogue, Duke’s-place, and the new synagogue, Crosby-square, says,—

“ I may fairly infer, from the above respectable sources of information (the best that can probably be obtained on this subject), that the Jews have suffered much less from cholera in proportion than the other classes of the community, probably not more than 13 out of a population of 20,000 ; whereas, up to the middle of September, the deaths from cholera in the metropolis amounted to 12,837. This would give a proportion of 0·6 per 1000 ; whilst the deaths vary in the Superintendent-Registrar’s district from 1 in 1000 of the living at Hampstead, to 29 in 1000 at Rotherhithe. At Whitechapel the deaths were 6 in 1000 ; in Shoreditch, 9 in 1000 ; and in the City of London, 7 in 1000.

“ This comparative immunity of the Jews from the ravages of cholera may perhaps be accounted for in the following manner :—

“ 1. It is well known that, however poor the lower class of Jews are, they never crowd more than one family into the same room ; whereas, among the lower orders of other communities, especially among the Irish, the system of subletting rooms to different families is by no means of unfrequent occurrence. Three or four families are known to occupy a single room.

“ 2. The Jews are, as a class, not given to the abuse of intoxicating liquors. I have had, during the last twenty years, much intercourse with the Jews, and I cannot call to mind a single instance of drunkenness in any family I have visited.

“ 3. The Jews, in virtue of their religion, are particular in the food they eat. All shell-fish is avoided, and the meat which is exposed for sale is inspected by an officer appointed for the purpose of ascertaining the healthy condition of the animals when killed, and, if any disease is found in the slaughtered animal, it is condemned, and not allowed to be sold for human food.

"4. Sabbath rest is strictly enjoined by their religion, and is for the most part rigidly observed.

"5. The Jews are unable, from religious motives, to enter our workhouses, and, being comparatively few in number, are relieved by the more wealthy classes of their own persuasion, and a sufficient staff of relieving-officers is appointed to inquire into cases of distress, which being promptly relieved, extreme destitution is avoided.

"6. The Jewish festival of the Passover enjoins every Jew to have his house thoroughly cleansed annually, and the rooms of the lower classes are, for the most part, annually limewhited."

SECTION V.

On the Predisposing Causes of Cholera.

DURING the late, as in former epidemic attacks of cholera, various theories were advanced, in this and other countries, respecting the essential or primary cause of the disease: this being so, and as, moreover, the views of those advocating sanitary principles have sometimes been misconceived as to the amount of influence they attribute to defective drainage, cleansing, water-supply, &c., it is desirable to explain that the following observations refer strictly to secondary and predisposing causes; or, in other words, to those conditions which, by favouring the action of the essential and at present unknown cause, tend to the reception and spread of the disease. It is further necessary to premise, that ignorance of this essential cause need in no degree operate as a bar to the full and successful investigation of the various circumstances which give force and impetus to this as to other destructive epidemics. It will, indeed, immediately occur to those who are familiar with the study of natural phenomena in general, that the objects of the present inquiry are precisely of the same character as those forming the subject-matter of other similar branches of research; in which the successful observer is more concerned to determine the laws and conditions of the forces he studies, than to wander in search of the essential nature of these last. There is still another consideration which it is proper to notice, as having a direct bearing on the question about to be discussed. In glancing over the multitudinous forms of disease to which the human body is subject, it soon becomes apparent that, although secondary or predisposing causes are most important in all, their influence is specially operative in the great zymotic class to which the various forms of fever, as well as cholera, belong. Observation and experience have further shown that in this class the predisposing causes are more susceptible of detection, and, which is still more important, of removal, than in more ordinary or sporadic diseases, such as inflammation of the lungs, of the stomach, or brain. The principal reason of both these facts, speaking generally, appears to consist in this: that in zymotic disease—I allude here to the leading members of the class, not to the specific diseases, such as syphilis

and hydrophobia, at present included in the category—the predisposing causes are, to a great extent, external to the body, and thus open to investigation; whilst, in sporadic disease, they, for the most part, are internal, depending on certain modifications of structure and function, the nature of which is but very imperfectly known: there are exceptions in both cases, but that this is a real distinction is patent to all observers; the victims of typhus, for example, present nothing peculiar in their internal organization which renders them, more than others, specially liable to its assaults; the most robust countryman, if placed in one of the crowded and filthy lodging-houses of London, that is, if he be exposed to the external predisposing causes of fever, is as subject to attack as a delicate and weakly person. But as regards such sporadic diseases as apoplexy, bronchitis, or insanity, it is obvious that the liability to these depends, in a great degree, on certain internal conditions of organization, which may even, in some instances, be transmitted from the parent to the offspring, and so become hereditary.

Predisposing Causes of Cholera.—Some of the most valuable evidence obtained during the late epidemic is that relating to the various circumstances which favoured its extension, or to the predisposing causes of the affection. What these causes were, considered in the aggregate, has been sufficiently indicated in the preceding sections; but it will now be proper to consider them individually, so far as sanitary measures are concerned, and to explain in what way they operate injuriously on the human body. There is, however, one great difficulty which presents itself on the threshold of such an inquiry, and it is this: in densely populated districts, where zymotic diseases prevail, the various predisposing causes, such as overcrowding, foul water, open cesspools, &c., are usually all present, therefore acting together, and concurring in the production of a common result. Successfully to analyse causes thus combined is obviously a process demanding ample data and much caution; but, at the same time, it is one familiar to all engaged in scientific pursuits, in which one of the primary objects to be accomplished is to investigate groups of co-existent, and frequently most intimately associated, but yet distinct phenomena, in order that the exact signification of each may be determined, and its right value assigned. It is not pretended that the present state of sanitary science will allow of this analysis being completely effected, but several important data have been already acquired; and these, like the known quantities in mathematics, may be employed to discover what at present is obscure or unknown.

On the Respiration of a vitiated or poisoned Atmosphere.—The quality of the air which is habitually breathed is a matter, before all others, of supreme importance to health; but upon this point very vague and often most preposterous notions are entertained. It may appear almost incredible that, by many persons even of the middle ranks of life, the foul exhalations of privies, stables, and cow-stalls, are deemed to be innocuous, or even beneficial; and yet it is certain that such opinions are by no means rare. I have heard in a London Board of Guardians the argument maintained, that the effluvia from a cesspool could not be noxious because the speaker, who was advanced in years, had lived close to one all his life. In one of the eastern counties it is deemed to be a beneficial thing for children labouring

under hooping-cough to hold them over a privy "early in the morning." A more prevalent opinion is that the air of a cow-stall, no matter how many animals are crowded together, is particularly advantageous, especially in consumptive cases. Even by many of those who have paid some attention to the sanitary question, the grosser and more palpable contamination of the air of towns by smoke has attracted more general attention, and has given rise to more stringent legislation for its removal, than the infinitely graver evils arising from those subtle, invisible, but all-powerful effluvia, proceeding from decomposing organic matter, whether animal or vegetable, which, in a multitude of different, and by the general public little-suspected ways, lay the foundation for those diseases which so frequently debilitate or destroy numbers of the labouring classes. Properly to estimate the baneful influence of these agents, it must be understood that the lungs incessantly receive an enormous amount of atmospheric air, into which all the impure gaseous matters generated in towns are poured. The activity of this process may be estimated by the following facts: at each inspiration there enter the lungs of an ordinary sized person about 20 cubic inches of air; and there being 20 respirations in a minute, 400 cubic inches of air enter in that time, 14 cubic feet per hour, and 366 cubic feet, or 56 hogsheads, per diem. To meet this, the heart sends into the lungs at each contraction two (some say three) ounces of blood; there are about 75 pulsations in a minute, during which 150 ounces are propelled into the lungs; a quantity which gives 562 pounds in one hour, and 13,488 pounds, or about 24 hogsheads, in 24 hours.

The Blood absorbs poisonous Gases.—It is further to be understood that the living body has no defensive power, either against the entrance into the lungs of the most poisonous gases, when these are suspended in the atmosphere, excepting in certain instances, where they are much concentrated; or against their absorption by the blood as it circulates through those organs: thus, if an animal breathe an atmosphere containing an injurious amount of a poisonous gas, as carbonic acid, sulphuretted hydrogen, chloroform, &c., the gas is taken up by the blood, is by that fluid carried into the very substance of the vital organs, and either seriously affects the system or destroys life. In respect to these phenomena, there are none of those beautiful protective contrivances seen in so many other parts of the animal frame; nature, it is evident, designs that safety should be found among animals in their instinct, and in man by the exercise of reason and experience. It is almost needless to point out that there are several ways in which aerial contamination may be caused, so as to predispose to disease, the most important of which I purpose now to consider.

Overcrowding.—Overcrowding is a relative term; it has reference, not simply to the absolute number of individuals lodged in a given cubic space; but also, and in an important manner, to the means of renewing the air; since a comparatively small number of persons may be injuriously crowded in a large room, wanting ventilation; whilst a larger number may safely occupy even a smaller apartment, provided proper precautions be taken. This may appear to be a trite remark, and yet it is certain this simple axiom is often violated; for example, I have seen many charity-schools, even of a recent construction, and situated in the open country, which were expensively built, spacious, and lofty, and yet so defective in proper outlets for the foul air, as to be most injurious.

the senses of a visitor, and debilitating to the children and teachers. In the present excessive pressure for space, in all quarters—in the dwellings of the poor, in workhouses, in prisons, in lunatic asylums, in hospitals—the question of ventilation is not merely one of health, it is one of economy; and there is, on both these grounds, no subject more eminently worthy of study and investigation. Of all the causes which predispose to preventible disease, the most influential and deleterious, so far as my observations extend, is overcrowding—a conclusion supported by the experience of large establishments of every description, as well as by that of most medical men. My reasons for this opinion, so far as cholera is concerned, are principally as follows:—

I. In the large majority of instances in which cholera has broken out with unusual violence, it has, on careful investigation, appeared that, whatever might be the case in regard to other noxious conditions which might or might not be present, overcrowding was never absent: so far as my own personal experience extends, I have found no exception to this statement. Thus, among the hop-pickers at East Farleigh, many of those attacked with cholera had used bad water and eaten putrid fish, but others who suffered had partaken of neither one nor the other; all these people were, however, greatly overcrowded in ill-ventilated rooms or sheds: and so in the institution in Hackney-road, where the mortality was 15 per cent., the inmates were amply supplied with food and other comforts, but they were lodged in overcrowded and ill-ventilated dormitories.

Secondly, a large number of examples has occurred in which the force of the epidemic was in the ratio of the overcrowding, all other circumstances being the same. Thus, among the workhouses of the metropolis, although the official returns relating to them have not yet been received, it may be stated that the attacks were the most numerous in those establishments in which the wards were the most crowded and defective in ventilation. As an example of this may be mentioned the workhouse of Shoreditch, which suffered most severely; so that, among the inmates, 109 cases of cholera, 61 terminating fatally, besides a large number of diarrhoeal cases, occurred between December, 1848, and September, 1849. This house is, in all the older parts, most defective in construction; several of the dormitories and other rooms were found, when inspected by Dr. Arthur Farre and myself, in the beginning of 1848, to be low, dark, and ill-ventilated. In reference to the above attacks, the medical officer, Mr. Clark, says—

“I am convinced that wherever large numbers of human beings are congregated together, and who eat, drink, and sleep in the same apartment, as is the case of the young and old in workhouses (among which classes diarrhoea has in our house been most prevalent), there the inmates are most liable to suffer.”

In a most fatal outbreak, occurring in a large establishment for pauper children, and to which the public attention was at the time painfully directed, it was observed that the girls suffered more than the boys; and yet the former, as is usually the case in such institutions, were in better condition than the latter. On investigation it was found that the girls' dormitories were more overcrowded, and much worse ventilated, than those of the boys; and this was the only difference I could discover to explain the greater number of attacks in their case.

Several instances, of a similar kind to the last, occurred among the general population—when, that is to say, other circumstances being the same, the extent of the overcrowding appeared to make the difference in the severity of the attack. This was the case, so far as could be learnt from a careful investigation, in the place called Jennings'-buildings, Kensington, of which an account has been given in a previous Section. (See p. 59.)

The Committee of the Academy of Medicine of Paris, in their instructions to the people, place the avoidance of overcrowding at the head of their precautions:—

“The first, and without doubt the most important care, is to maintain around each person a pure atmosphere, experience having shown that those who neglect this precaution in the time of the epidemic are the most exposed to be attacked by it; consequently persons should avoid as much as possible sleeping in too great numbers in the same room,” &c.*

Cause of the Evils of Overcrowding.—Although the evil resulting from this inordinate overcrowding is generally recognised, it appears desirable shortly to notice how the mischief is caused. The skin and the lungs exhale at each moment of existence, independently of carbonic acid, in itself a poisonous gas, a certain amount of animal matter of a highly putrescent nature, as it has been demonstrated by condensing experimentally the vapour in which, as it passes from the lungs, it is suspended. If there be no free escape, this effete matter, owing to the condensation of the expired air, is deposited on the walls of sleeping-rooms, clings to articles of clothing,† bedding, &c., and is the source of that nauseous smell perceived on entering dirty and crowded dormitories, school-rooms where many children are collected, &c. If a matter thus noxious, and to remove which out of the system nature has provided such important organs as the lungs and the skin, be again introduced by respiration into the living body, as happens when a number of people are crowded together, as we see among the poor, what but the most pernicious effects can be expected?

Atmosphere of Privies and Cesspools.—Next in order as to the extent to which it prevails, and the evil results produced, is, according to my experience, what may be called “the privy atmosphere,” arising from neglected privies and overflowing cesspools, and which abounds in poisonous gases, sulphuretted hydrogen being one of the most abundant and deleterious. A large body of evidence, which I have received from medical practitioners both in London and other populous towns, as Liverpool, Manchester, and Nottingham, distinctly proves that persons habitually exposed to such an atmosphere are thereby predisposed, in an especial degree, to fever and other sickness; and that, in courts and alleys, those persons who reside in the houses immediately adjoining foul privies, all other circumstances, as to food, lodging, &c., being equal, suffer more from typhus than the other inhabitants. So much is

* Séance de l'Acad. de Méd., Mars 13, 1849.

† This is a reason why the clothing even of boys, and especially in pauper establishments, should, as far as possible, consist of articles capable of being readily washed. I have been informed by the surgeon of a large parish that the health of the boys had improved on such a change being made in their clothes: in every instance these and the bedding should as often as possible be freely exposed to the external air.

this the case, that houses so situated have been pointed out to me by the medical officer as being the constant seat of fever, families after families coming to reside in them, and all in succession being attacked.

Influence of putrid Animal Effluvia.—Many facts induce me to believe that the action of the bowels is particularly prone to be disturbed by breathing privy air, and that this is the most common cause of the diarrhœa so generally prevalent among the poor of crowded cities. Nightsoil must be regarded as consisting essentially of decomposing animal matter; and that the gaseous products of such matter will induce severe diarrhœa has been proved by a number of well-marked cases. The importance of determining the influence of putrid animal effluvia upon the human body is so important, that I trust I may be permitted to introduce some details in reference to this point.

Christchurch Workhouse, Spitalfields.—To the following case I would particularly solicit attention, as it illustrates at once the frightful evils arising from noxious trades carried on in the midst of a great city, and the almost insurmountable obstacles opposed to their removal. Christchurch workhouse, Spitalfields, belongs to the Whitechapel Union, and contained, at the time to which reference is about to be made, about 400 children and a few adult paupers. Immediately opposite the workhouse, and only separated from it by a narrow lane a few feet wide, was a manufactory of artificial manure, conducted by a Frenchman, in which bullocks' blood and nightsoil were desiccated by dry heat on a kiln, or sometimes by mere exposure of the compost to the action of the sun and air, causing a most powerful stench. The surgeon of the workhouse, Mr. Byles, to whom I am indebted for the particulars of this case, and who is an experienced practitioner, attempted to have this great nuisance removed, as he had distinct evidence of the injury it inflicted upon the health of nearly 400 children who were inmates. In a letter with which Mr. Byles has lately favoured me, he says,—

“The obvious injury produced by the disgusting effluvia to the inmates of the workhouse, especially the children, induced me at various times to array against him what imperfect power the law afforded; and whenever the manufacture was stopped *pro tempore*, an improved condition of the health of the children was clearly perceptible. Distinct from the production of diarrhœa, other prejudicial effects were noticed when the works were at all actively carried on, particularly *when the wind blew in the direction of the house: e. g.* prevalent fever of an intractable and typhoid form; a typhoid tendency to measles, small-pox, and other infantile diseases; and for some time a most unmanageable and fatal form of aphthæ of the mouth and genitals, running rapidly into gangrene. From this last cause alone, I think, I had 12 deaths among the infants in one quarter.”

In the month of December, 1848, when cholera had already occurred in the Whitechapel Union, 60 of the children in Christchurch workhouse were suddenly seized with violent diarrhœa in the early morning, but by prompt and efficient treatment all recovered. This attack was attributed by Mr. Byles to the same cause as the evils above narrated, and in consequence legal steps were adopted, by which, although after so many lives had been sacrificed, the proprietor was compelled to close his establishment. The circumstances which are now to be related are most instructive. Five months afterwards—namely, in April, 1849—

a new proprietor having taken the premises, the master of the workhouse observed that the works had been resumed; and a day or two subsequently, the wind changing and blowing from the manufactory, a most powerful stench pervaded the workhouse, and on the night following, or rather in the early morning, 45 of the boys, whose dormitories directly faced the manufactory, were again suddenly seized with severe diarrhœa; whilst the girls, whose dormitories were in a more distant part, and faced in another direction, escaped, with the exception of two or three, who were attacked on the following Sunday. This second outbreak, occurring immediately upon the reappearance of the putrid effluvia, was again attributed by the medical officer to the same cause as the first attack; and on inquiring subsequently into the circumstances of the case, I ascertained that the new proprietor had found on the premises some barrels filled with the putrid matter used by the former occupant; and that, in the attempt to remove these, some barrels broke, and produced a most offensive effluvium. The circumstances of this remarkable case left no doubt on my mind that the diarrhœa was, in both attacks, directly caused by the effluvia proceeding from the putrid blood, and other animal substances used, and that all the other evils above noticed were mainly dependent upon the same cause. This conclusion is much strengthened by the fact, that, during the last nine months, according to the statement of the medical attendant—

“There has not been a single death in the workhouse, except from chronic disease, or in the case of children brought in with mortal diseases upon them, such as cholera or typhus in their final stages.”

Case in St. George's, Southwark.—In the summer of 1847 a similar manufactory for preparing artificial manure from putrid blood, &c., was established in the heart of a populous district in the parish of St. George, Southwark. On the very first occasion when operations were commenced, a most powerful stench pervaded the neighbourhood, so as to attract general notice, and in a short time afterwards a large number of persons living around were suddenly seized with diarrhœa. In consequence of this outbreak, Mr. Hooper, a gentleman in large practice, and who related the circumstance to me, had a great number of applications for medicine; and being convinced that the diarrhœal attack depended upon the poisonous animal effluvia, the necessary steps were immediately taken by the parochial authorities, the nuisance was at once suppressed, and the diarrhœa directly subsided.

In reference to these two cases, it is not superfluous to remark, that, in both, the parties offending were foreigners; a class of persons, it appears from information I have received, who are somewhat extensively engaged in the manufacture in question, and who are attracted to London by the existence of facilities so properly denied them by the laws of their own country.

Dr. Baly, physician of the Millbank Penitentiary, has expressed his opinion that the diarrhœa and dysentery to which that prison is subject are connected with the noxious animal effluvia wafted across the Thames from the bone-boiling establishments at Lambeth, having observed that those diseases are most prevalent when the wind blows from that quarter.

The preceding instances relate to diarrhœa, but a large number of examples might be adduced to prove that cholera was most severe in

houses situated close to privies, and especially where the filth from the cesspools found its way into the interior, a circumstance not unfrequently happening. Thus Mr. Howard, a very intelligent medical visitor, states that, in Stepney, the intensity of the epidemic was in the ratio to the proximity and foulness of the privies; and this was especially the case when, as often happened, the drain from the privy ran under the house. Thus, in one house in East Field-street, where the privy overflowed into the yard, the mother and two children died in one week, and a fourth person died at the next door. In Liverpool, houses were pointed out to me by the medical officer, situated in courts next to privies, and where it had been remarked the attacks and deaths from cholera were more severe than in the other houses.

As so many instances of the noxious influence of animal effluvia have been adduced in a preceding section, I need only remark further, that, whether these proceed from foul drains and sewers, from pigsties, from slaughterhouses, or bone-boiling establishments, they are all more or less injurious, and predispose to cholera, according to their intensity and concentration.

As to the mode in which this poisoning of the blood induces diarrhœa, the clue to this phenomenon is to be found in the fact, that the mucous surface of the intestines, small as well as large, is an important and normal organ of excretion. Owing, however, to the more obvious action of absorption going on, by which the nutrient part of the food is taken up and carried into the system, this excretory office, so well known to the physiologist, is liable to be overlooked; but it is essential, and it is incessantly going on—a fact which is conspicuously seen in animals deprived of food, where fæces are still formed. Now, as the final cause of this important operation is to get rid of certain noxious matters, which are poured into the blood as the necessary result of healthy vital action, it is a natural inference that, when any additional matters, hurtful in themselves, are accidentally introduced into the common mass of the circulating fluid, the excretory action of the intestinal mucous surface will be preternaturally augmented, and purging consequently produced. An instance of this form of diarrhœa, and depending on the same cause—the respiration, namely, of an atmosphere poisoned by putrid animal effluvia—is that of medical students, who, when first visiting the dissecting-room, are for the most part subject to relaxation of the bowels.

Evils of defective Water-supply.—A supply of water, unlimited, pure, and of suitable qualities, is one of the prime and essential conditions of health. Water forms nine-tenths of the whole weight of the body; it thus penetrates into the very substance of every organ, and in the ratio of its importance; it is the medium for all the changes effected by nutrition in the composition of the body; and as these never cease for an instant, it is constantly being introduced from without by absorption, and discharged by excretion.

Water stands in relation to several distinct wants:—

- I. It is essential as an article of food.
- II. It is necessary to personal cleanliness.
- III. It is essential to external cleansing, whether of houses, streets, waterclosets, or sewers.

In each and all of these respects the supply of water has an immediate, and, in some instances, an unsuspected effect, on the health and well-being of the labouring classes: even in villages and rural districts many of the evils about to be explained exist, and have attracted the attention of those interested in the condition of the poor, especially of the clergy and of medical practitioners.

I. Influence of polluted Water.—It has been proved by unquestionable evidence, that the water used by the poor of London, and even by many of a higher class, is contaminated in various ways by decomposed organic and other noxious matter; as by the absorption of deleterious gases when kept in tanks, butts, and tubs; by percolation into wells of the contents of cesspools, graveyards, drains, &c.; by the original impurity of the supply, as in the case of the water taken from the Thames by so many of the Water Companies, &c. Now that these injurious substances get into the blood is susceptible of distinct proof. It is one of the most familiar truths of physiology, that not only pure water, when introduced into the stomach, is absorbed, but, which is not so well known to non-professional persons, all matters dissolved in it are also taken up, and this without any regard to their quality, the most poisonous being soaked up by the blood-vessels of the alimentary canal as readily as the most harmless. Thus a second great inlet is established by which injurious substances in a liquid form as certainly find their way into the circulating blood, as noxious aerial agents do by the way of the respiratory apparatus. Injurious articles of solid food, capable of solution, are also absorbed, though by another agency (that of the lacteal vessels), and so by a rather more circuitous route reach the blood.

One or two illustrations will serve to establish this important fact, and also to elucidate the mode in which diarrhœa may be induced by the use of polluted water. If a liquid poison, such as opium or nuxvomica in solution, be introduced in a living animal into a loop of intestine, tied at each end, the poison is taken up by the blood-vessels and destroys life. Even mineral poisons, when they enter the stomach, are taken up by the vessels and mingle with the blood, where they have again and again been detected by analysis. A well-known instance of such an occurrence is the discoloration of the skin following the continued use of the nitrate and oxide of silver in cases of epilepsy—a phenomenon only explicable by the introduction of those substances into the circulation. This absorption into the system of soluble matters throws light upon the way in which noxious substances dissolved in water operate injuriously on the animal economy. It also explains how diarrhœa may be one result; since it is found that saline aperients produce their effect, not by acting directly on the mucous surface of the bowels, but by being first absorbed into the blood, and secondarily inducing a flux into the intestine. This explanation may to some persons appear improbable; but the analogous phenomena produced by arsenic will indicate how certain substances introduced into the blood may produce their specific effect on the alimentary canal: if, for example, this substance be applied to a wound or ulcer, by becoming absorbed it may produce inflammation of the stomach. It is then a general principle of physiology, that substances which have undergone perfect solution are, when swallowed, capable of permeating the blood-vessels of the alimentary canal, and of mingling

with the blood. This process also takes place rapidly, so that prussiate of potash, when injected into the stomach, has been detected two minutes afterwards in the urine; a rapidity of transmission explicable on the velocity of the circulation, which is so great that the whole mass of the blood is carried round the body in about a minute.

Proofs of the noxious Effects of polluted Water.—It has already been explained that, in populous localities, the different causes of unhealthiness are so combined together as to render it difficult to demonstrate their isolated influence. In the section on the habitat of cholera, several well-marked instances are however given, in which it is difficult to arrive at any other conclusion than that the use of water polluted by decomposed organic matter acted intensely as a predisposing cause. Such a case is that of Silkmill-row, Hackney, where those persons only who made use of the filthy water into which the matter of a cesspool had found its way, were attacked with cholera and diarrhœa, whilst the other inhabitants, who were supplied from other sources, escaped. Windmill-square, Haggerstone; Albion-terrace, Wandsworth-road; and the locality first attacked at Rotherhithe, are, in my opinion, similar instances. In one court (Surrey-buildings, Horsleydown), consisting of 13 small houses, each generally occupied by one family, no fewer than eight deaths occurred in one week, and another in the ensuing week; all the houses were supplied with water from a sunk tank, the edge of which was even with the pavement, so that the washings of the court ran into it. In another court, in Lambeth, two most severe cases of cholera having occurred, the surgeon was induced to examine the water supplied by a pump, when he found it discoloured and so foul that “it stank at a distance of the contents of a cesspool;” the piston of the pump was removed, and no other case of cholera occurred in the court up to the date of the report recording this case.

As a specimen of the kind of water which so many of the poor of London are compelled to use, and the dire consequences thence resulting, the following details are given of a well-known and miserable locality, called “Jacob’s Island.” Mr. Walsh, one of the medical inspectors, visited this place, and from his Report the particulars here given are derived:—

“Jacob’s Island is the name given to a portion of the parish of Christchurch, Bermondsey. It is surrounded by the tidal ditch or mill-stream. In the island and on the banks of the ditch are 300 or 400 houses, inhabited chiefly by persons employed in the wharves and shipping, called ‘long-shore men,’ and their families, but partly by persons whose characters are more known than respected. The drains and sewers of all the houses that are drained empty themselves into the ditch. The refuse of the neighbouring houses, and the contents of their privies, are also thrown into the almost stagnant water; heaps of filth, which projected into the water when I first visited the place in August, still project [this was written in March, 1850] about the same distance, being constantly renewed above as the lower edge is carried away. One hundred and fifty of the houses have no water-supply whatever; and when I first visited here in August, many of the inhabitants were in the habit of using the water for cooking and other purposes; nay, had even drunk it unboiled during the heat of summer. Some of the houses are totally unsupplied with water from any other source than the ditch; a few have wells which communicate with it. The analysis shows the immense quantity of organic matter which it contains; some of the water bottled in November was opened this week

(March 30th); the stench is unbearable. The ebb and flow of the tide are regulated by a floodgate; the occupier of the mill lets the water in and out as he pleases: sometimes it is retained for many days, and sometimes the bed is nearly dry for the same length of time. The foulness of the water and of the mud at these times is incredible. Dead animals abound in it: only last week a calf lay there till the carcase burst."

The following analysis, very carefully made at the College of Chemistry by Mr. Charles Mansfield, under the inspection of Dr. Hoffman, will demonstrate the quality of this ditch-water: other analyses are added for the sake of comparison:—

TABLE* showing the Quantity of Organic and other Matters contained in an Imperial Gallon of Water taken from the

	Artesian Wells of		Water-works of Hampstead	Thames at			Tidal Ditch of Jacob's Island.
	Grenelle.	Trafalgar Square.		Twickenham.	Greenwich.	London Bridge.	
Organic matter	0·014	1·008	1·97	3·48	4·08	7·0	13·36
Total residue } on evaporation }	9·87	69·40	40·11	22·49	28·04	28·59	37·07

Mr. Walsh directed the attention of some gentlemen, unconnected with the neighbourhood, to this deplorable case:—

"They were so shocked at what they saw, and so convinced that such a state of things could not be allowed to last long when once the attention of Government had been called to it, that they subscribed for the erection of two covered water-butts, one in London-street, and one in Gutteridge-place, and for their daily supply for six months by the Vauxhall and Southwark Company, the only one which had mains in the neighbourhood. A strong memorial was addressed by these same gentlemen to the Commissioners of Sewers; a public meeting was called, at which I attended with the Honorary Secretaries of the Metropolitan Sanitary Association; and a Committee has been formed to act with the Bermondsey Improvement Commission."

This provision was made in the beginning of the present year: what is to be the lot of the poor people on the gratuitous supply ceasing does not appear.†

* See Quarterly Journal of Chemical Society of London, vols. 1 and 2.

† The following is a copy of a handbill which was issued by the benevolent "strangers" who came forward to rescue the inhabitants from the misery and danger to which they were exposed:—

"To the inhabitants of Jacob's Island.—The shameful want, in Jacob's Island, of water fit to drink, has led some persons, strangers to the neighbourhood and parish, to arrange with the Southwark and Vauxhall Water Company for a temporary supply of water, free of rent or charge to the inhabitants, by means of two tanks, now set up in Gutteridge-place and in London-street. As the whole expense of this measure will be borne by the parties above referred to, it cannot be continued beyond six months. This should give time for the inhabitants to obtain from their landlords, or from other persons interested or responsible, a proper supply of water in every house, and such other changes and improvements as are indispensable for health and decency. The occupiers of houses that are at present supplied from the ditches only, who may wish to have better water, are requested to apply immediately to Mr. Dale, at No. 6. Mill-

That the use of such polluted water should not produce the most serious results was impossible. Decomposed organic matter, principally of an animal character, is precisely the agent calculated to induce relaxation of the bowels, a most pernicious thing during epidemic cholera, and which has in a multitude of instances led to an attack.

Mr. Walsh had not the superintendence of the house visitation in Bermondsey; but with the assistance of Mr. Martin, the medical officer and registrar of the district, and by examining, on the spot, the Registrar-General's returns, he has obtained some interesting information:—

“ In 1832 the earliest fatal cases of cholera occurred close to this ditch; in 1849, also, the earliest fatal cases occurred here: diarrhœa and cholera abounded; hardly a house escaped, perhaps not one. On the south side of an irregular square, formed by the tidal ditch and its immediate neighbourhood, there occurred between June and October 41 deaths, in the centre 12, and on the west side 8, making a total of 61 deaths. Of this square, two whole sides and more than half the superficies are taken up with granaries, a timber or stave yard, and other uninhabited portions of ground. Dyspepsia, cachexia, a peculiar ‘sickness of stomach,’ and irritable bowels, are at all times very prevalent. There is very little typhus or acute febrile diseases.”

Some further details will still more strikingly demonstrate the evils caused by the use of this polluted water. Thus, in one part unsupplied with water, and where therefore the inhabitants used the ditch-water, five deaths from cholera occurred, whilst in Edward-street, closely adjoining, with thirty houses, but all supplied by the Water Company, only one death took place.

In regard to the pipe-water supplied by the Water Companies, this being so generally used, it is impossible to demonstrate its injurious influence by special instances; but as it is known that this water abounds in impurities, and that even, as Dr. Hassall has demonstrated, the water which is submitted to filtration before it is delivered to the public still contains much solid organic matter, no other inference can be formed but that such water would be liable to disturb the bowels, especially during such an epidemic as cholera; and that in this way it would act as a predisposing cause of the disease. Nor can there be any doubt, recollecting how actively water absorbs noxious gases, that the use of open tanks, tubs, &c., would, by promoting such absorption, and by exposure to the atmosphere favouring decomposition, increase the evil, especially in poor and crowded localities. It is also a point of vast importance to be understood, that, as matters in solution pass through filters, except they are removed by chemical action, organic substances completely dissolved, and in the condition precisely adapting them for absorption into the blood, are not removed from water derived from a foul source even by filtration.*

* The following appears to be a marked example of marsh-water exciting fever; it is related by a physician, M. Boudin, who has paid great attention to the influence of external causes in the production of disease:—“ In July, 1834, 800 soldiers, all in good health, embarked on the same day in three transports at Bona, and arrived together at Marseilles; they were exposed to the same atmospheric influences, and were, with one essential difference, supplied with the same food and subjected to the same discipline.” On board one of the vessels were 120 soldiers; of these 13 died on the passage from a destructive fever, and 98 more were taken to the military hospital of the lazaretto at Marseilles, presenting all the pathological characters proper to marshy localities;

II. Independently of the evil consequences following the internal use of impure water, the want of an ample supply of water, as regards personal cleanliness, has in various ways a marked influence on the health of the poor in large towns. As this subject, however, is only indirectly connected with cholera, one illustration of its importance will here be adduced to show how invariably every sanitary amelioration is followed by an improvement in the public health. In rebuilding the city of Hamburg, after the fire, an ample supply of water, at high pressure, was provided, and among other results was one not anticipated, the diminution, namely, of that loathsome affection the itch; this has been so marked as to attract the attention of the medical practitioners, by some of whom it was calculated at 50 per cent. This is a complaint to which many of the London workhouses are subject; and yet, after having, with Dr. Arthur Farre, investigated the whole subject, I do not hesitate to affirm that, with proper arrangements, not a single case ought to exist among the permanent inmates of those establishments. But to secure this desirable object an unlimited supply of water for regular personal ablutions is a necessary condition; by which means it is certain the general health would also be greatly invigorated.

III. With respect to the supply of water for the purposes of external cleansing, the necessity of this is generally recognised. Without an unlimited supply the filth cannot be washed out from courts and alleys, even when the expense of flagging them has been incurred; drains and sewers wanting such a supply, invariably, and of necessity, become loaded with foul deposits; nor, in the absence of this prime sanitary requirement, can the disgusting cesspools, which are an unceasing and most active source of disease, be replaced by waterclosets.

Drunkenness and Excesses.—Abundant evidence was afforded during the late epidemic that habitual drunkards were highly predisposed to cholera; and of them a large number perished. Occasional excesses also led to a vast number of attacks; thus, at Hamburg, it was ob-

so that "by the side of a simple intermittent was seen a pernicious fever; here was a type recalling the yellow fever of the Antilles, and there was the cholera of the Ganges with its most terrible traits." On an inquiry being instituted, it was ascertained that on board the affected ship the water supplied for the soldiers, owing to the haste of the embarkation, had been taken from a marshy place near Bona; whilst the crew, not one of whom was attacked, were provided with wholesome water. It further appeared that the nine soldiers who escaped had purchased water of the crew, and had consequently not drunk the marshy water. Not a single soldier or sailor of the other two transports, who were supplied with pure water, suffered.—*Essai de Géographie Médicale. Par Dr. Boudin, p. 53.*

Dr. Evans, of Bedford, related to me an equally well-marked instance. A few years ago he was staying at Versailles with his lady, when they both became affected with ague, and on inquiry the following facts were disclosed. The town of Versailles is supplied with water for domestic purposes from the Seine at Marli. At the time in question, a large tank, supplying one particular quarter, was damaged, and the mayor, without consulting the medical authorities, provided a supply of water consisting of the surface-drainage of the surrounding country, which is of a marshy character. The regular inhabitants would not use this polluted water; but Dr. and Mrs. Evans, who were at an hotel, drank of it unwittingly, and it was also used by a regiment of cavalry. The result was, that those who drank the water suffered from intermittent fever of so severe a type that seven or eight of the soldiers, fine young men, died on one day, September 1, 1845. On a careful investigation it was ascertained that those only of the troops who had drunk the marsh-water were attacked; all the others, though breathing the same atmosphere, having escaped, as did also the townspeople.

served that there was among the numerous sailors in that great port a regular accession of cholera every Monday and Tuesday, owing to the men going ashore and getting drunk on the preceding Sunday. In London also, several medical men informed me they had noticed the same thing; excess either in drinking or eating, particularly if improper food was used, such as pork, cabbage, &c., being followed by attacks, which thus became more frequent on Sunday night and Monday.

Noxious Effects of bad Food.—There is no doubt that many attacks of cholera were also indirectly induced by defective nourishment, and by the use of improper food among the more destitute part of the population: thus I saw one poor family in Lambeth, where the husband had died three weeks previously, and the son was at the time in collapse; they were in great misery, and the only food they could procure were muscles, under the circumstances a most objectionable article of food: these are matters, however, which, though most painful, do not belong to a sanitary report. But it is proper to state that urgent representations were made in different parts of the metropolis, both by the local authorities and medical officers, respecting the open sale of articles of food, especially fish, altogether unfit for human consumption; it was stated, further, that the existing state of the law did not secure the suppression of this practice, which, in poor neighbourhoods, was felt to be a great evil. Several marked examples were brought under my notice, where violent attacks of cholera were distinctly traceable to the use of putrid fish, bad pickled pork, decayed cheese, &c. It would therefore appear desirable, in the event of any return of the epidemic, that more facility should be afforded for preventing the sale of such deleterious articles.

Were this a medical, in place of a sanitary Report, various other predisposing causes would have to be considered—as errors in diet, and especially as regards the imprudent use of vegetables and fruit; bodily and mental exhaustion, and especially night-watching; fear; grief; the improper use of aperient medicine,* &c. &c.

In weighing the influence of the predisposing causes noticed in this section, it must be borne in mind that during the epidemic, when at all active, great multitudes of persons are in a state in which the slightest possible cause will turn the balance. Many instances were related to me where a sudden fright brought on an attack. In one case a young woman was seized immediately after receiving a letter announcing the death from cholera of a near relative; in another, from seeing a cholera patient carried along the streets. There is no doubt that many attacks were thus brought on by grief, attending a relative suffering from the epidemic, night-watching, &c., which were often attributed to direct infection. In fact, the most trifling circumstance, bodily or mental, was often sufficient to give a fatal force to the efficient cause of the disease.†

* One very painful case of this kind was related to me: a lady gave to her four young children some aperient she was in the habit of administering; this was at night. Early the next morning the children were seized with violent purging and vomiting, and ultimately they all died.

† Some interesting examples, illustrative of the operation of predisposing causes, will be found in a valuable paper on the Health of London during the Epidemic, by Dr. Webster, F.R.S. (London Journal of Medicine.)

SECTION VI.

On the Primary Seat of Cholera, and on the Existence of a Premonitory Stage; Notice on Diet and on the Treatment of Premonitory Diarrhœa.

ALTHOUGH it forms no part of this Report to enter into the pathology of cholera, yet some notice of the nature of the epidemic and its leading features is indispensable, both for the due appreciation of the measures adopted by the General Board, and also for properly estimating the influence of the poisonous atmosphere generated by the neglect of sanitary principles.

Primary Seat of the Disease.—One of the most fundamental questions of the whole inquiry concerns the primary seat of the disease—a question which has been answered (principally) in three ways:—

I. It has been affirmed that one or other part of the nervous system is the true seat of the disease.

II. By another and more numerous class of observers it is said the alimentary canal, and especially the small intestine, is the part primarily affected.

III. The last and more prevalent doctrine is that according to which cholera is a disease of the blood.

I. The first of these opinions has had many advocates, especially among the Russian physicians. The arguments adduced at St. Petersburg in support of this hypothesis are principally as follows:—1. Disturbances of the nervous system, such as intermittent fevers, neuralgia, dragging pains in the limbs, were common both before and during the epidemic: all diseases bore a nervous character, whilst inflammatory diseases were rare. 2. The premonitory symptoms were not essential, and merely indicated deranged innervation: in many cases the disease broke out so suddenly, and destroyed the vital powers, especially of the spinal cord, so rapidly, that no other seat of the evil could be assumed. 3. Recovery was so rapid, in many cases, that it was impossible there could be any serious lesion of the intestinal canal. 4. When there were consecutive diseases, they were always affections of the nervous system—sopor, delirium, mania, and a fever resembling but not identical with typhus. 5. A cure was never obtained through the customary modes of controlling irritation of the intestinal canal. 6. The electrical equilibrium was destroyed, so that from all bodies, even when isolated, electricity passed off, and thus sudden lesion of the nervous system was produced.*

These views have been received with little favour either in England or on the Continent; and it is certain that, whilst some of the arguments stated would carry no weight with physiologists, others, and especially that relating to the alleged incapability of controlling the alimentary canal, have been distinctly disproved by the extensive experience acquired in this country during the late epidemic. The rôle assigned to the spinal cord is certainly erroneous, as all the phenomena con-

* See British and Foreign Medical Commission Report, 1832, p. 10.

nected with that centre are secondary, and are even occasionally entirely absent; and the same remark applies with much greater force to the brain, which retains its powers in a most remarkable manner, even when black blood must be circulating through it, and when the patient is pulseless.* As to the influence of the sympathetic nerve, so little is known of its normal functions, that every theory respecting its agency in cholera must be purely speculative.

II. It is not surprising that the intestinal canal should, by many observers, be regarded as the part primarily affected in cholera; the vascular injection of the mucous membrane, the enlarged state of its glands, the enormous discharges, and the important changes in the epithelium—all these are such striking phenomena as would naturally lead to such a conclusion. But, as so often happens in analogous instances, these obvious features of the disease would seem after all to be but secondary, depending on certain antecedent and essential changes which they mask and conceal. When the remarkable desquamation of the epithelium, discovered and so accurately described by Dr. Boelm of Berlin, was first announced, it appeared to be so entirely abnormal that that excellent observer, with many others, regarded it as being the essential morbid phenomenon. In the progress of knowledge, however, the nature of the discharges and the changes in the structure of the intestine have lost much of the importance naturally attributed to them when first observed, since it has been proved that the separation of the epithelial covering of the intestinal villi is a healthy process, occurring at each act of digestion.† Again, with respect to the glands

* Some of the phenomena witnessed in cholera are difficult of explanation, according to the received opinions in physiology: thus, as stated above, patients perfectly blue and pulseless often have their mental faculties not disturbed; and under the same conditions persons have walked a considerable distance. I saw lately a case of complete cyanosis from malformation about the heart, and yet the patient was distinguished by superior intelligence. All this shows that too much importance has been assigned to what is called pure arterial blood; but which, in fact, contains all kinds of impurities, and even normally a considerable portion of carbonic acid.

† This important fact was first observed by Professor Goodsir; but as some doubt has been thrown on this point, I may mention that the fact of the desquamation occurring in healthy animals has been repeatedly corroborated by Mr. Quekett. Mr. Rainey, who, at my request, was so kind as to make some examinations, also found that the villi were denuded in the dog, but this happened towards the end of the digestive process, and when it must be presumed the epithelial cells had performed their office of absorbing the chyle. It is not intended, by these observations, to deny the great importance of the enormous discharge of the epithelium occurring in cholera. My observations lead me to dissent from the conclusion of Dr. Parkes, that this detachment of the epithelium is altogether a post-mortem phenomenon. I have often seen the whole length of the small intestine crammed with the choleraic mass, and consisting to a great degree of epithelium—an amount totally incompatible with mere detachment after death. The principal reason adduced by Dr. Parkes, in support of his opinion, is, that the epithelial cells cannot be detected in the stools; but when specimens are selected from different parts of the small intestine, evidence is acquired that the detached epithelium, as it passes downwards, undergoes, as it certainly does under normal conditions, a gradual disintegration, and so disappears. Thus in the duodenum and upper part of the jejunum, the epithelial particles are found in a most perfect condition, the outline and points of the prisms being intact; but in proceeding downwards there is an evident change, the cells becoming less perfect, truncated, and broken up; and at the same time, molecular matter in large quantity is found, apparently the result, in part at least, of the disintegrating process. It is important to notice that these changes are not dependent on the time that has elapsed since death, but are connected with the relative parts of the intestine. Moreover, epithelial particles, which have escaped

of the mucous membrane, it is true they are, and especially in the cold stage, much enlarged, but they rapidly return to their original size; and as regards one of the most common appearances—the ruptured and honeycombed condition of Peyer's glands—this is in some, though not in all instances, a post-mortem alteration, as Virchow has produced the same change artificially by soaking a healthy intestine in water.*

III. As regards the doctrine which teaches us that cholera is a blood disease, it may be remarked that it is advocated by many of the most distinguished pathologists in Europe who have examined the subject; and further, that it is in strict keeping with modern physiology.† If, as is generally admitted, cholera depends on some aërial agent, it is certain that such would, of necessity, first operate on the human body, through the way of respiration, and on the blood. The incessant introduction of atmospheric air into the lungs, and the well-ascertained fact, explained in the preceding section, that the blood, as it moves through those organs, has in itself no power of selection, but absorbs even the most deadly poisons, provided they are presented in the gaseous form; the analogy afforded by the production of intermittent and remittent fever from the respiration of a malarious atmosphere; and by continued fever being caused, either directly, or indirectly in the way of predisposition, by the inhalation of certain effluvia mingled with the air;—these are so many circumstances which tend powerfully to corroborate the view here advocated, and to demonstrate the supreme

destruction, are often found in the stools. The following remarks of Drs. Reinhardt and Leubuscher, on this point, entirely correspond with my own observations:—"We have frequently seen unchanged cylindrical epithelium (in the sediment of the cholera stools), sometimes single cells, sometimes several connected together in large arched-form portions, as they naturally cover the villi; at other times, tessellate epithelium from the neighbourhood of the anus; and also a detritus, in which can only be perceived fragments of cells." "The quantity of epithelium found in the stools does not correspond with the amount of that detached in the intestine: it must therefore be assumed that a large portion undergoes disintegration in the intestine." "In the large intestine the quantity of unaltered epithelium is less than in the small, owing to its detention and the destructive changes consequent thereon."—(*Beobachtungen über die epidemische Cholera in Berlin, 1849*, pp. 5, 74.) In some examinations of the intestines of persons who have died of typhus, I have found a large amount of desquamated epithelium, and, as in cholera, more abundant and more perfect in the upper than in the lower part of the small intestine: the villi were of course more or less denuded.

The extraordinary rapidity with which some patients recover is another indication that in such cases no very serious organic changes can have occurred. I have seen, for instance, a man standing at the door on Wednesday, who on Monday was in perfect collapse.

Many interesting and important changes do of course take place, and especially toward the close of the stage of collapse, and in that of febrile reaction, in various organs, of which the exudation of a finely granulated or amorphous substance, as seen in the intestine, uterus, &c., the interesting changes in the kidney, and occasional diphtheritic deposit, as in the œsophagus and vagina, may serve as examples. But the very number of the organs affected is one of the strongest arguments for cholera being a general and not a local affection; whilst the nature of the changes—the congestion, the extravasation of blood so commonly happening, and the equally frequent exudation—are so many unmistakable indications that the disturbance is seated, not in the nervous system, which is essentially connected with motion and sensation, but with the nutritive apparatus, and, as contended, with the blood.

* See 'Medicinische Reform,' No. 10, p. 64; and Reinhardt and Leubuscher, *l.c.*, p. 77.

† Among the German pathologists who advocate this view may be mentioned the names of Brandt, Schmidt, and others.

importance, in regard to the healthy condition of the body, of the quality of the inspired air. The most satisfactory proof would, however, be derived from cases of pure cholera sicca; by which term is meant to be indicated, cases in which there are no discharges from the mucous surface of the stomach or bowels, either evacuated or retained; in which there is no morbid change of the alimentary canal; in fact, where the blood, and the blood only, is affected. But it is doubtful, although there is nothing in the pathology of cholera incompatible with such an occurrence, whether such instances have ever been actually observed; for it is well known that in some cases denominated cholera sicca, and where during life there had been neither purging nor vomiting, it has been found after death that the intestines were filled with the choleraic matter.* One of the most accurate observers among those who have seen the disease in India, where this kind of attack is more frequent than in Europe, Dr. Parkes, in allusion to such cases, says, "there is always some effusion of the thick white substance into the intestines, but often little of the watery part of the blood."†

The view here advocated is, then, that which attributes cholera to a poisoning of the blood, and which regards the profuse discharges as an effort of the *vis medicatrix naturæ*, the various morbid changes in the intestines and other organs being strictly of a secondary character. To those who do not well consider the forcible efforts so often made to remove even a local source of irritation, as daily seen in surgical practice, and the large amount of liquids required to carry out of the system excretory matter, this may perhaps appear an unlikely explanation; but if, as is the conviction of so many pathologists, the whole mass of the circulating fluid be poisoned in cholera, an effort at depuration,

* Dr. Watson mentions such a case ('Lectures on the Principles and Practice of Physic,' vol. ii. p. 487); and Dr. Leubuscher gives a similar one ('Medicinische Reform,' No. 18, p. 124). In a return from Grove Hall Lunatic Asylum, Bow, it is stated that, in some of the cases, death took place without any purging or loss of animal heat. In these and similar cases it is probable that, owing to the rapid and profuse effusion into the bowels, the muscular coat becomes paralysed from over-distension, as the right cavities of the heart are known to be from the blood which accumulates in asphyxia. It is probable that, if it were possible to watch the progress of collapse in all cases, it would in many be found that the discharges are retained for a few hours in the intestines. Dr. Friedländer, a very intelligent physician at Hamburg, mentioned to me the following instructive facts. He is physician to a large pauper establishment for old men and women, among whom six cases of cholera occurred, in all of which it was observed that the abdomen became rather full and prominent, with a doughy feel when handled; this fulness was further remarked to be confined to the lower part, the region of the stomach being rather sunk: contemporaneously with this change, the skin, owing to the drain on the fluids of the body, began to lose its elasticity, so that there was a tendency to *pitting*, when the tip of the finger was pressed; this condition was followed in two, four, or six hours by profuse purging, which, as usual, preceded the vomiting. The very first case I saw in England in 1848 was precisely of this kind, some hours having elapsed after the occurrence of perfect collapse before the bowels were profusely evacuated: on questioning the patient as to whether he had perceived any fulness of the abdomen before the purging, the man replied, "Oh yes, it was as tight as a drum." It is evident that in some such cases the patients might die before the discharged substances passed per anum. Two cases occurred under the care of Mr. Guazzeroni at Kensington, in which all the symptoms were most marked (cramps, blueness, &c.), where there was neither purging nor vomiting of any kind: these, which would appear to have been cases of true cholera sicca, both recovered.

† 'Researches into the Pathology and Treatment of the Asiatic or Algid Cholera,' p. 114.

commensurate with the extent of the morbid change, would obviously be demanded.

In considering this theory, the character of the blood in cholera, and the nature of the discharges poured into the stomach and intestines, become points of much interest. Animal chemistry is not sufficiently advanced to reveal what is the essential change induced in the blood; but independently of this, it is essential to recollect that almost every analysis yet made relates to blood taken from patients after severe purging and vomiting had occurred; usually when collapse had supervened, and sometimes even after death; when, consequently, the quality of the circulating fluid had been secondarily and powerfully affected; and when therefore most of the changes detected depended, not on the specific cause of cholera, but on the flux from the alimentary canal, and on the arrested renal and other secretions. That this is the right view to take of the analyses hitherto made, is shown by the fact, that most, if not all, the morbid changes of the blood described in the epidemic of 1832, as in that of 1848-49, precisely correspond to the losses in the fluid owing to the profuse discharges and the arrested secretions; thus the blood of cholera patients is thicker, tarlike, and less coagulable; it contains less water and more solid matter than is normal, owing to the loss of water and the consequent accumulation of the red corpuscles and albumen; the fibrin appears to be diminished, or perhaps altered in quality; and urea is in excess; as regards the salts conflicting results have been obtained. It is much to be regretted that the attention of chemists has not been directed to the condition of the blood in the very outset of the attack; that is, on the first occurrence of the premonitory symptoms. It would also be most desirable to examine blood taken from persons generally during the presence of the epidemic. It is indeed stated by Canstatt, that it was observed at Munich and other places, in the former epidemic, that the blood during the time of the cholera, and even shortly before its appearance, was sometimes observed to be of dark colour and thick consistence as in cholera, though removed from persons not suffering under the disease.* Dr. Ainsley also states, that the blood exhibits morbid appearances when drawn from patients at an early period of an actual attack of cholera.†

The evacuations, it is well known, consist of a fluid portion and of a solid part, which, by rest, separates as a sediment. Without entering into the extensive inquiry relating to the microscopical characters of these discharges, it may be observed that the liquid part is derived from the serum

* Die Specielle Pathologie und Therapie. Band II. p. 416.

† The following conclusions, which are considered by Dr. Garrod as established by the researches made in 1832 and 1849, will show the present state of knowledge as regards the blood in cholera. (For details see the valuable paper of Dr. Garrod in the *London Journal of Medicine*, No. 5, p. 409.)

1. That in cholera the physical characters of the blood are altered, the tendency being to become thicker, tarlike, and less coagulable.
2. That the proportion of water is much diminished.
3. That the specific gravity of the serum is very high, owing especially to the increased albumen; this fluid is also less alkaline in its reaction.
4. That the salts are not only not decreased in amount, but are augmented.
5. That urea exists in increased quantities, varying according to the stage; being small in quantity in intense collapse, increased during reaction, and in excess when consecutive fever occurs.

of the blood, and contains, though by no means in the same proportion as in the serum itself, albumen, extractive matter, and salts; fibrin also appears to be discharged; and, more frequently than is generally supposed, even the red particles, which I have detected in cholera-stools that to the naked eye appeared to be perfectly colourless. There is no just ground for believing that any portion of the fluids, so profusely discharged per anum, are derived from the water swallowed so eagerly in these cases. From these observations, it is then obvious that, with the exception of the epithelium and a portion of water, which is, of course, mixed with the matters vomited, the enormous evacuations are derived directly from the blood, a fact which constitutes one of the most essential points in the pathology of cholera.*

* In order to indicate more exactly the results of chemical examination, in reference to the blood, the following analyses are appended:—

ANALYSIS of the LIQUID PORTION of CHOLERA STOOLS, showing the relations to the period of the disease. (Dr. Parkes on the Intestinal Discharges in Cholera, London Journal of Medicine, No. 2, p. 134.)

PERIOD.	Specific Gravity.	Albumen in 1000 parts.	Extractive in 1000.	Soluble Salts.	Total Solids.
Diarrhoeal	1012.9	0.466	3.846	9.04	13.9
Ditto . . . . .	..	0.29	6.82	5.99	13.1
Early Algide	1009.	2.4	1.27	10.98	14.65
Developed ditto severe	1009.5	1.18	0.55	9.14	10.87
Ditto ditto . . . . .	..	2.186		7.52	9.706
Ditto ditto moderate	1008.3	0.27	2.23	8.33	10.83
Ditto ditto	1005.8	3.2		5.827	9.027
Commencement of reaction . . .	1014.0	20.84		6.34	27.187
Ditto ditto	1008.91	1.48	6.055	9.085	16.62
Relapse	1017.83	0.855	17.35		18.21
Ditto . . . . .	..	..	4.589	3.881	8.47

ANALYSIS of STOOLS in four cases of Cholera. (Becquerel, 'Archives Gén. de Méd.,' t. xxi. p. 192.)

	Specific Gravity.	Water.	Solid parts in 1000 parts of liquid.	Albumen.	Chloride of Sodium.	Matter in Suspension on Filter.
1. Cholera of } Alkaline 5 hours . .	1007.20	988.60	8.64	Imponderable.	3.7	2.76
2. Blue stage, do. .	1007.40	979.57	13.29	Ditto.	..	7.14
3. Of 18 hours, do. .	1009.70	781.87	14.54	3.22	5.24	3.59
4. Of 18 hours, do. .	1011.04	928.83	15.12	4.51	7.81	2.05

M. Becquerel also detected albumen in four out of six analyses of the matter vomited which offers the greatest analogy with that passed by stool, except that it is either neutral or more frequently acid. This distinguished chemist regards the morbid liquid vomited "as consisting of the serum of the blood diluted in a variable quantity of water, in the midst of which floats coagulated albumen, of which the fragments are united by mucus, in which is found a large proportion of chloride of sodium." M. Becquerel appears to have detected much more albumen than observers in this country. In some analyses of cholera-stools made by Dr. Leeson and Mr. Taylor, at St. Thomas's

Among these considerations, which are merely thrown out as indications, the occasion being unsuited to a full discussion of this important subject, I will only add, what is familiar to all who are acquainted with cholera, that the most severe and rapidly fatal cases are those in which the discharges are small in quantity, and where the blood is apparently not freed from the poison it has imbibed; whilst those attacks where the evacuations are more profuse have, on the whole, a better chance of recovery.* Temporary relief is often, too, afforded by the evacuations, especially by vomiting, though this may, in part at least, depend on the removal of distension.

Existence of a Premonitory Stage.—The valuable Reports, both of the Metropolitan Sanitary Commission and of the General Board of Health, distinctly prove the general existence of a premonitory stage in cholera, consisting of diarrhoea. But, notwithstanding the establishment of this fact, the vast importance of the subject, in relation to preventive treatment, demands that the results obtained in the metropolis during the late epidemic should be recorded; and this is the more necessary, seeing there is still some difference of opinion among medical practitioners, on several points connected both with the extent and the signification of the diarrhoea accompanying an outbreak of cholera.

It has often been said that persons, and particularly in India and other places where the efficient cause operates with intense force, are occasionally struck down as by a cannon-ball; many such cases were reported during the late attack in London, persons having sometimes fallen down in the street in collapse, or having been suddenly seized at their work, or whilst at home, and especially in the early morning; and in these instances it was often stated there were no premonitory symptoms, the individuals being, as it was affirmed, in perfect health up to the very time of the attack. The result of extended inquiries and observation induces me to doubt, if any case whatever of collapse occurs without a premonitory stage. But in advancing this opinion it is not meant to be asserted that diarrhoea is the invariable precursor: there are many other though less obvious signs of the coming attack. For example, it was the result of a cautious investigation instituted at the General Hospital at Hamburg into the history of between 300 and 400 cases of developed cholera, that the attack was in many cases preceded by depression of spirits, loss of appetite, uneasiness about the bowels, and an inclination to go to stool, but without effect; dizziness,

Hospital, only a very minute trace of albumen could be discovered. Dr. Parkes says, "The albumen and salts do not seem to bear a very constant proportion to each other; but salts scarcely ever appear to be thrown out without carrying with them a portion of albumen, however small—the greatest amount of albumen is very trifling." "There is no doubt that it is incorrect to speak of cholera-fluid as the serum of the blood; the fluid is derived from the serum, but it is not composed of all its ingredients." Drs. Reinhardt and Leubuscher's researches as to the liquid portion of the stools, show that in many cases it contains albumen, in others not. They confirm the fact, first ascertained by Guterbock, as to the presence of chloride of sodium, which they think, though the point requires more careful examination, exists in an inverse ratio to the albumen. (L. c. p. 5.) As regards the sediment of cholera evacuations, the subject is too extensive for consideration in this Report.

* Dr. Parkes has particularly illustrated this point ('Researches,' &c., p. 116 *et alibi*).

noises in the ears, and other disturbance of the sensorium; oppression at the præcordia, the person often waking up with the feeling of want of breath; nightmare and frightful dreams were often experienced: one premonitory sign was an uneasiness in the legs, with slight twitchings or spasms, which, for the most part, closely preceded the profuse evacuations, and evidently indicated the approaching cramps; it was so common at Hamburg, that the people called it "stretching of the legs." This peculiar twitching was often observed in London during the late and previous epidemic, especially in those districts where the disease was severe. The medical officers of St. George's, Southwark, informed me they had noticed it; and some of these gentlemen had, indeed, themselves suffered from the affection. Mr. Chandler, one of the medical officers of Rotherhithe, and who had the direction of the measures instituted by the guardians, says, "a very common premonitory sign consisted of twitchings of the legs." It is an interesting fact, pathologically, that these slight cramps, which, like the other symptoms, were not, of course, always followed by collapse, being, indeed, most amenable to treatment, often occurred without being preceded or accompanied by diarrhœa—a circumstance which tends to show that the violent cramps and spasms accompanying the profuse discharges in collapse do not depend on these, but rather on the morbid quality of the blood deranging the force of the spinal cord.

General existence of Premonitory Diarrhœa.—The phenomena just enumerated are some of the indications of the disturbed state of the system prior to the full development of cholera, to which, during the prevalence of the epidemic, attention should be paid, both by the patient and the medical practitioner, as warnings of the mischief which may follow unless warded off by prompt treatment. But the general precursor is, as it is well known, diarrhœa, often accompanied with vomiting and other symptoms, such as spasms, sinking, and coldness of the surface.

Difficulty of detecting it.—The actual extent to which this affection exists has not, however, hitherto been very satisfactorily determined either in this country or on the continent, and yet this is a cardinal point in the inquiry. There are, as a little consideration will suffice to show, several obstacles which often render it difficult to ascertain the existence of this diarrhœa when it has been actually present. Among the first of these are the extraordinary apathy of the poor, and the difficulty, so often encountered when questions are put, of arriving at the truth. Many most remarkable instances of both these difficulties occurred in the metropolis. One of the surgeons of a large parish informed me that he was called to a child labouring under a fatal attack of cholera; that in consequence he visited the house several times, and on each occasion inquired of all the inmates if any one was suffering from bowel complaint, and was answered in the negative; soon after the father was seized, and became collapsed; and then it turned out that this person, who was present when the surgeon made his visits, had been suffering for some time with diarrhœa, which he had totally neglected. Very frequently, and especially among the poorest and most destitute classes, the only person who could give information was the patient himself, who, from the intense suffering and profound prostration, often of course was in a state in which no

satisfactory replies could be obtained. Little reliance in such cases can be placed on the statement of friends, as the following case will show. In a country town near London, where the disease had been most severe, I visited a case of cholera, and on inquiry of the medical officer if there had been any premonitory diarrhœa, a decided negative was given. I then asked the daughter, a grown-up young woman, if her mother, who had become collapsed in the early morning, had had any looseness of the bowels on the preceding day, when a second negative was given. Not feeling satisfied, I questioned the patient herself, when she answered, "Oh! yes, Sir, I was purged all yesterday." The fact is, that unless the medical attendant makes a more searching inquiry than it is usually possible for a parochial surgeon, overwhelmed as he is with incessant labour, to undertake, the exact preceding circumstances, especially if it be a question of only slight disturbance of the bowels, to which the poor pay no attention, and usually regard as a salutary operation, cannot be ascertained.

The same kind of difficulty was observed in other countries. Thus, at Paris, M. Guérin says that, in the last epidemic, one of his colleagues, who was too young to have seen the cholera of 1832, but who was a careful observer, affirmed that in several cases there had been no premonitory symptoms. Not crediting this, M. Guérin went to the people, and convinced his colleague that in these supposed sudden attacks cholera had pre-existed during several days, and in one case for six weeks. The editor of the *Gazette Médicale* also points out the difficulty of ascertaining the existence of the premonitory diarrhœa; and he adduces the case of a man, said to have had a "foudroyant" attack, where there had been diarrhœa for two or three days.

Dr. Macloughlin's Inquiry.—Dr. Macloughlin, one of the inspectors who superintended the house visitation in several populous districts, paid special attention to the question how far premonitory diarrhœa prevailed; and the results are embodied in the following extracts from his Report:—

"In 1832, when the disease raged so severely in Paris, I attended the hospitals daily, and took my duty in the district in which I resided, to attend on cholera cases. My attention was very soon called to the fact that in every case where the patient or his friends could give any account of the state of health previous to an attack of cramps, vomiting, &c., there had been for several days previously a diarrhœa more or less urgent." "When I was placed in charge of the house-to-house visitors in the districts of Poplar, Stepney, and Greenwich, and temporarily of six other unions, I invariably met the medical officers, and also invariably inquired of each of those gentlemen whether he had had any case of cholera without a premonitory diarrhœa. I found that in all the cases diarrhœa had uniformly preceded the attack. It is true that several cases were reported to me as cases of cholera without any premonitory symptoms; and although these were reported by gentlemen of superior medical knowledge, and whose zeal in the discharge of their duties could not be questioned, yet, on more minute examination in their presence, it was invariably found that they had either been misinformed by the patients or their friends, or that they had not attentively enough inquired into the previous history of the cases." "Consequently, I am justified in concluding that I have not found in 3902 cases of cholera which occurred in the above nine unions one case of cholera without premonitory diarrhœa."

The large number of developed cases comprised in this inquiry,

namely 3902, of which 1658, or 42 per cent., were fatal, and the care with which it was conducted, give great value to Dr. MacLoughlin's conclusions. It is proper to add that these cases, with the exception of a very small number, occurred before the house visitation was established.

Experience of other Countries.—The experience of other countries unequivocally proves that attacks of cholera are, for the most part, preceded by diarrhœa. Thus Dr. Müller, in his account of the epidemic of 1848 at St. Petersburg, says,

“Premonitory signs, usually continuing for several days, and invariably connected with disturbances of the digestive organs, scarcely ever fail.”*

The following passage is extracted from the ‘Lancet.’—

“It has been noticed by the Russian physicians, that a sudden attack of the disease is but apparently so; and that the precursory symptoms are invariably a painful or painless diarrhœa, with from one to six daily evacuations, which have all the ordinary fœcal characters; whilst the dejections in the subsequent stage, or that of collapsus, resemble, as is well known, a decoction of rice. The necessity of controlling the disease in this stage was felt by the physicians of Moscow, and diarrhœa dispensaries and immediate assistance in the patients' own dwellings were regularly organized.”†

Dr. Neville, an assistant physician of the General Hospital at Hamburg, after stating his opinion that in every case there were premonitory symptoms of some kind or other, as noticed in a preceding page, adds, “the most frequent and marked was diarrhœa.” It was, however, noticed in this city, as elsewhere, that the premonitory symptoms, whatever they might be, were, at the outset of the epidemic, rapidly followed by the actual attack, death ensuing in a few hours. At this epoch cases unquestionably occurred without antecedent diarrhœa: but in about four weeks it was observed that the premonitory signs, and especially the diarrhœa, were more marked and continued for a longer time; so that, about the middle of the epidemic, I was informed by Dr. Buch that almost all the cases were preceded by diarrhœa.

At Berlin the experience was similar. In a communication with which I was favoured by Dr. Romberg, Professor of Clinical Medicine, it is stated that “diarrhœa for the most part precedes the actual attack of cholera, and this, too, in the commencement, progress, and termination of the epidemic.” This distinguished pathologist further remarks that “he has not seen such cases of sudden seizure as those described in India, without premonitory signs.” Dr. Simon, an accurate observer and assistant physician to one of the cholera hospitals, stated to me, as the result of express inquiry, that, on the first outbreak of cholera in that city, about half the persons seized had preceding diarrhœa, in the others it was absent: the attacks were most rapid, and almost always fatal. “In about three weeks the disease changed; it was then preceded by diarrhœa, sometimes of several days' duration.” In the admirable treatise of Drs. Reinhardt and Leubuscher it is remarked that “diarrhœa was, in the greatest number of cases, the first abnormal phenomenon, which later issued in cholera, the pa-

* ‘Einige Bemerkungen über die Asiatische Cholera,’ p. 46.

† *Lancet*, vol. ii. 1848, p. 464.

tients suffering twelve hours, one, two, eight, and even fourteen, days before other phenomena arose.”*

In a very interesting discussion which took place at the Academy of Medicine at Paris, relative to the instructions to be issued to the people on the occurrence of cholera, M. Guérin, whose opinions were unanimously adopted, spoke as follows:—“Cholera is almost always, if not always, preceded by a period of incubation, consisting for the most part of a diarrhœa *sui generis*, commonly denominated ‘cholérine;’ more rarely there is a disturbance of innervation. Now according to the admission of all practitioners, it is extremely easy to arrest the disease at this period; it is therefore of importance to inculcate this double truth in the public mind; this is indeed a precept which appears to me to have the same bearing as that of the cauterisation of a wound after the bite of a rabid animal.” The reporter of the commission appointed to draw up the instructions for the public, M. Martin Solon, agreed in these views, and altered the instructions accordingly.†

The results of these various inquiries distinctly show that, as a rule, cholera is preceded by diarrhœa; that the cases in which this is absent are strictly exceptional, the number of these exceptions invariably diminishing in proportion to the care and accuracy of the investigation; that the greatest number of these exceptions occur on the first outbreak of the epidemic in a new district; and that, consequently, there is in the vast majority of attacks a period varying from a few hours to several days, or it may be weeks, during the whole continuance of which the aid of medicine, as the experience of all European countries has shown, is as pre-eminently successful, as it becomes powerless in presence of complete collapse, when, it may be said, in the language of Professor Romberg, who speaks after having directed the treatment of a thousand patients, “it is most fortunate if a man escape death; if he is saved, it is by the *vis medicatrix naturæ*, not by curative means.”‡

Amount and Character of the Diarrhœa prevailing during Cholera.—It is well known, even in some degree to non-professional persons, that when a severe outbreak of cholera occurs in any particular city, town, or village, it is invariably accompanied by a large amount of diarrhœa. Now, it is a most important question clearly to determine the relations of this diarrhœa to the destructive disease with which it is concomitant: is it an integral part of the epidemic, or a mere coincidence as to time and place? As regards popular opinion among the educated classes, there is no diversity of belief; the two affections—diarrhœa and cholera—being considered as but different stages of the same common disease, varying, indeed, and most widely, in degree, but being essential in kind. There is not, however, the same uniformity among medical men; for although, so far as my experience extends, those whose information is the most extended and practical admit no real distinction, there is a limited number who contend that true cholera is a disease distinct from the commencement, and not to be confounded with the prevailing affections of the alimentary canal;

* *L. c.* p. 3.

† *Gazette Médicale*, 1849, Séance Mars 19me.

‡ The opinions of some of the medical officers will be found in the section on the house visitation.

so that these last cannot run on into collapse, though they may predispose to an actual attack. It is obvious that those who hold these opposite opinions would regard with very different eyes the value of any preventive measures, directed, like those, subsequently to be described, of the Board of Health, to the early discovery and prompt treatment of diarrhœal cases occurring in a cholera district; since it is a very different thing to consider an attack of purging and vomiting as merely predisposing, like a multitude of other circumstances, to cholera, or as a part and parcel of the disease, and which may prove to be the actual commencement of the most severe form of the affection.

The general history of cholera as well as more special investigation equally seem to show that the more commonly received is the true conclusion. Simultaneously with the outbreak of cholera in a city, if severe, it is found that almost the whole population suffer from a disturbed state of the bowels, the predominant tendency being to relaxation. Dr. Crawford, in his account of the destructive epidemic at St. Petersburg, says, it was observed that those persons whose bowels were habitually constipated became spontaneously free; whilst those whose bowels were usually free experienced a tendency to relaxation. In Hamburg a vast number of persons were affected with diarrhœa; others suffered from an uneasy sensation and rumbling of the bowels; whilst in others constipation occurred. Dr. Simon states, with regard to Berlin, that, before and during the cholera, diarrhœa was very common, almost every person in that city having been thus affected.

In the metropolis, wherever the epidemic was severe, there was an enormous amount of bowel complaints, consisting essentially of diarrhœa, with which vomiting was very commonly combined. The surgeries of the medical officers in all such localities were besieged with applicants; the various dispensaries gave assistance to multitudes of patients; and a vast number applied, in all the poorer districts, to the druggists' shops; and, besides all these, many neglected to seek assistance, trusting either to various remedies of their own, or allowing the affection to take its course.

There is, then, no exception to the rule, that, whenever cholera breaks out with any force as an epidemic, it is preceded by and accompanied with a vast amount of diarrhœa. In several instances it was indeed asserted by the local authorities in this country, that although, as the mortality tables showed, cholera was actively prevailing, the diarrhœal attacks were few in number; but without a single exception, when a searching inquiry was instituted, the fallacy of such assertions became apparent. It was the same in small villages and country towns, in all of which, when invaded by cholera, so far as my experience extends, it invariably happened that bowel complaints were general. In the section relating to the system of house visitation, many illustrative details on this point will be found.

The constant relation thus observed between the appearance of cholera and diarrhœa cannot, it is certain, be a mere coincidence; and this being so, it is not only the most obvious, but likewise, as it would seem, the most philosophical explanation, to refer the two affections to the same cause, operating with varying degrees of intensity. This view is strongly supported, or rather, it may be affirmed, substantiated,

by a careful investigation of the following characteristics by which these attacks of choleraic diarrhœa were distinguished from ordinary diarrhœa :—

1. The nature of the evacuations, which were for the most part thinner than usual, often light coloured, and evidently approaching to the characteristic rice-water discharges into which they often ran.
2. The sudden nature of the attack and the profuseness of the discharges. This was often observed as regarded the vomiting which so frequently occurred with the purging, and which was compared by many observers to the flow from a fountain.
3. The frequent absence of pain, a circumstance which led to a large sacrifice of life; the victims, lulled into a fatal security by the absence of suffering, taking no measures to arrest the evacuations, though these often continued for days.
4. The great prostration, the tendency to coldness, and the very frequent occurrence of cramps.
5. The time of the attack, being in several remarkable instances where large numbers of persons were simultaneously seized, like that of cholera, the early morning, from two till six.
6. The occasional occurrence of consecutive fever, similar to that following cholera : towards the close of the epidemic the diarrhœa very generally passed into low fever.

These peculiarities were so striking as to leave no doubt on the minds of those who witnessed these attacks on a large scale, that they were dependent on the choleraic poison; indeed, I can scarcely recall a single instance among the numerous medical officers whom I had occasion to consult on this point, where a different opinion was expressed.

Cholera commencing in Bilious Diarrhœa.—But, as among other practitioners it was occasionally asserted that the attack of true cholera was peculiar from the first as to the nature of the evacuations, it appeared to me desirable to make an extended inquiry; the result of which proved that, in a considerable number of attacks, ending in perfect collapse, and where the evacuations were examined by the medical attendants, there was in the beginning bilious purging, which, by degrees, became more and more serous, and at length of the perfect rice-water character. Several cases of this kind were related to me, and among others by the medical officers of Lambeth, particularly by Mr. Dawson and Mr. Mitchell. Dr. Waller Lewis, one of the inspectors, was so kind as to procure a considerable body of evidence of the same nature; from which the following details are taken :—

Dr. Burrows, who, with Dr. Hue and Dr. Roupell, had charge of the cholera cases that were admitted into St. Bartholomew's Hospital, says,—

“From what I could learn from many patients whom I interrogated, and from what I saw in a few at the commencement, I believe there is a period, of uncertain duration, when the stools are feculent, before they assume their peculiar rice-water appearance.”

Dr. Frederick Farre has given the particulars of several cases, in

which dark feculent motions preceded the rice-water stools. Mr. Wood, the apothecary of St. Bartholomew's Hospital, states,—

"I find it recorded in several instances that the evacuations contained feculent matter even after admission into our wards. In a very great number of other cases, where the evacuations were represented to have been dark and offensive, diarrhœa had existed for a period varying from two or three to ten days. Some of those cases which terminated fatally most rapidly commenced by a copious liquid and feculent evacuation."

Dr. Lewis, who carefully investigated this point, says, in speaking of the premonitory symptoms, that the disease was generally ushered in by great depression of the nervous and muscular powers, loss of appetite, and slight nausea, without actual sickness.

"In a few hours diarrhœa of the ordinary feculent character presented itself, accompanied with a greater inclination to vomit; and a cold perspiration over the whole surface of the skin. The diarrhœa soon increased in frequency, the stools being still feculent, but less so than at first; and vomiting came on. The peculiarity of the diarrhœa consisted in its utter painlessness and in the patient almost always imagining that the bowels would not be troubled any more for a long time. After these symptoms had continued a very variable length of time, from three or four hours to as many weeks, the character of the discharges entirely changed in their nature. This change usually took place gradually, but sometimes suddenly; from being of the ordinary feculent appearance, the ejecta became of a pale white, sometimes almost colourless, so well known by the simile of rice-water."

The experience of Berlin corresponds with those statements. Drs. Reinhardt and Leubuscher give the following account of the evacuations:—

"The first stools, so far as we could observe them in the few cases which are available for such examination in an hospital, were in the beginning thin, liquid, and feculent, mixed with the remains of food, and coloured by decomposed brownish or yellowish bile, and generally with numerous mucous flocculi. In a few cases this condition of the stools continued during the whole of the cholera attack; but the most usual course was this, that the remains of the food disappeared; that the stools at length consisted only of a thin, watery fluid, with mucous flocculi suspended therein, sometimes still mixed with green bile, which in some cholera cases remained during the whole attack. In the greatest number of cases, however, the stools were quite colourless, and without the least admixture of bile: these are the so-called rice-water stools."

"We regard the diarrhœa which arises under the influence of the general noxiousness (schädlichkeit) operating at the time of epidemic cholera as the one, and asphyxia as the other point of a progressive series of phenomena, with a number of intermediate stages." *

The great accuracy with which the investigation was made by these authors, who had constant recourse to the microscope, gives to their conclusions great weight.

All these facts distinctly show that, with some exceptional cases, where the discharges are from the first of a peculiar character, cholera usually commences with bilious purging. So intimately, in fact, are diarrhœa and cholera blended together, that it is often difficult to say when one has ceased and the other has begun: thus the diarrhœa may

go on, the discharges becoming more thin, watery, and light-coloured, and even rice-water, without collapse, and where by prompt treatment the disease may still be arrested, as happened in so many hundred cases during the house visitation in the late epidemic.

Notice on Diet, and on the Treatment of the Premonitory Diarrhœa.—On the first occurrence of cholera in this country, the General Board issued an official notification (dated October 5th, 1848), in which plain directions were given both for guarding the people from the use of improper food, and for the treatment, in the unavoidable absence of medical assistance, of the premonitory diarrhœa. As it is possible there may be a return of the epidemic, it is desirable to state what has been the experience of the last eighteen months upon these two important points.

On the influence of Diet.—The following extract from the official notification contains the recommendations of the General Board on the subject of diet :—

“Whenever Asiatic cholera is epidemic, there is invariably found among great numbers of the inhabitants an extraordinary tendency to irritation of the bowels; and this fact suggests, that every article of food which is known to favour a relaxed state of the bowels should, as far as possible, be avoided—such as every variety of green vegetables, whether cooked or not, as cucumber, or salad. It will be important also to abstain from fruit of all kinds, though ripe and even cooked, and whether dried or preserved. The most wholesome articles of vegetable diet are—well-baked, but not new bread, rice, oatmeal, and good potatoes. Pickles should be avoided. Articles of food and drink which, in ordinary seasons, are generally wholesome, and agree well with the individual constitution, may, under this unusual condition, prove highly dangerous. The diet should be solid rather than fluid; and those who have the means of choosing should live principally on animal food, as affording the most concentrated and invigorating diet; avoiding salted and smoked meats, pork, salted and shell fish, cider, perry, ginger beer, lemonade, acid liquors of all descriptions, and ardent spirits. Great moderation, both in food and drink, is absolutely essential to safety, DURING THE WHOLE DURATION OF THE EPIDEMIC PERIOD. One single act of indiscretion has, in many instances, been followed by a speedy and fatal attack. The intervals between the meals should not be long; cholera being uniformly found to prevail with extraordinary intensity among the classes that observe the protracted fasts common in the Eastern and some European countries.”

After having made extensive inquiries in Germany and in this country, I feel justified in stating that the soundness of these directions has been fully established. One great argument in their favour is, that the authorities of other European countries, on the approach of the epidemic, have from experience found it necessary to warn the people to abstain from such articles as those above enumerated, even when, as in the case of cabbages and other green vegetables, they formed a main part of the ordinary food of the working classes. It has been stated in the previous section, that many attacks of diarrhœa and cholera were brought on by excesses committed on Saturday night and Sunday; in all parts of the metropolis cases of this kind relating both to eating and drinking were reported to me by medical men. But besides this, instances were very common where the seizure resulted merely from partaking of a hearty meal of substances liable at such a time to disturb the alimen-

tary canal, such as veal, pork, eels, &c. It is particularly necessary to point out that during the epidemic influence even substances which in ordinary times are harmless may produce the most serious consequences; thus, in one instance, the children of a physician, having been allowed to partake of cherries, were all seized with alarming diarrhœa, which fortunately yielded to treatment.

It is also especially important to warn persons who have had an attack of diarrhœa of the necessity of a rigid attention to diet for some time subsequently; many persons in the state of convalescence fell victims to errors of this kind. On examining the returns of the medical visitors and inspectors such cases as these occur:—

“This case had been under treatment two or three days for simple diarrhœa, and was convalescent, when the patient indulged in eating plum-pudding for supper, and was seized in the night with rice-water purging and vomiting, and was soon in a state of collapse: she died in about 20 hours.”

Many of the cases which, after treatment, passed into cholera, were, like the present one, owing to indiscretion in diet, exposure, &c.

Notice on the Treatment of the Premonitory Diarrhœa.—In glancing at the treatment of the premonitory diarrhœa, it may be noticed that the one guiding fact to be borne in mind is, that the determining cause of the choleraic discharges operates from within the body and not from without; this being the broad distinction between the diarrhœa of cholera and that common form of the affection which depends on irritants acting on the exterior surface, speaking physiologically, of the bowel. Whatever theory may be formed as to the nature of cholera, all the best authorities agree in this view of the subject; there is then nothing to be expelled from the intestinal canal by purgatives; the object is to stop a morbid flux from the blood-vessels, and whatever will best effect this, the one great end, will constitute the most efficient treatment.

It is not intended by these remarks to affirm that cases of diarrhœa did not occur during the presence of cholera, which depended on the presence of unwholesome ingesta or of morbid secretions, where mild aperients were required; but these formed the exceptions, and demanded the greatest caution both as to diagnosis and treatment. I have known the most alarming and even fatal results produced by the administration of the mildest purgatives; and it is certain much mischief was produced by the notion, so common among non-professional persons, that all cases of looseness of the bowels are caused by some noxious matter which demands expulsion. Mr. *George T. Jones*, who treated, as a medical visitor, 1000 cases of diarrhœa, says—

“When a poor man is attacked with a flux of any kind, and especially diarrhœa, he invariably thinks that there is some peccant humour in his body which requires to be discharged, and forthwith sets about to expedite the removal of the offending matter. Hence a reason why during my visitorship I have met with so many cases of diarrhœa, aggravated by taking doses of Epsom salts, jalap, and other drugs.”

This common and dangerous error was dispelled by the house-visitation, so that, when this was established, but unfortunately only at the end of the epidemic,

“the people were better informed on this point, and were not so eager to take purgatives.”

The directions issued by the General Board for the treatment of the premonitory diarrhœa were as follows:—

“Medical authorities are agreed that the remedies proper for the premonitory symptom are the same as those found efficacious in common diarrhœa; that the most simple remedies will suffice, if given on the first manifestation of this symptom; and that the following, which are within the reach and management of every one, may be regarded as among the most useful, namely, twenty grains of opiate confection, mixed with two table spoonfuls of peppermint-water, or with a little weak brandy and water, and repeated every three or four hours, or oftener, if the attack is severe, until the looseness of the bowels is stopped; or an ounce of the compound chalk mixture, with ten or fifteen grains of the aromatic confection, and from five to ten drops of laudanum, repeated in the same manner. From half a drachm to a drachm of tincture of catechu may be added to this last, if the attack is severe.

“Half these quantities should be given to young persons under fifteen, and still smaller doses to infants.

“It is recommended to repeat these remedies night and morning for some days after the looseness of the bowels has been stopped. But, in all cases, it is desirable, whenever practicable, that even in this earliest stage of the disorder recourse should be had to medical advice on the spot.”

Experience of the Medical Visitors.—The gentlemen who acted as medical visitors in London were, almost without an exception, legally qualified practitioners; many of them were experienced physicians and surgeons. The results of their experience, considering the large number of patients whom they treated, have therefore great value; and, in order to place these on record, a series of questions were circulated, one of which was to this effect—“What remedies did you find most efficacious in stopping the premonitory diarrhœa?” I have carefully examined the returns of 40 of the visitors, who, in the aggregate, had attended 22,729 cases of diarrhœa, besides cases of rice-water purging. Of this number, 34 used, in the case of adults, some form of opium, variously combined with preparations of chalk, ammonia, sulphuric æther, astringents, and aromatics; two administered opiates when other remedies failed; and four did not use opium at all. Several of the visitors speak in the strongest terms of the success following the use of opiates; thus Mr. A. B. Allen, who attended 947 cases, says he found *pulvis cretæ cum opio* almost always succeeded.* In the severer forms of diarrhœa calomel and opium were extensively and effectually used; in such cases several of the visitors also found a combination of the acetate of lead and opium most successful; creosote, usually combined with laudanum, is named as having had great control over the vomiting. In the case of children, opiates were not so generally given as to adults; *pulvis cretæ compositus*, either alone or in combination with *hydrargyrum cum cretâ*, or *confectio aromatica*, was extensively used; but opium, in small doses, was also often given, and with the best results. I made extensive inquiries, and only heard of one or two cases where narcotism was

* Dr. M'William, F.R.S., who is the medical attendant of the Custom-house officers, provided the men with a preparation of chalk, kino, gum arabic, cinnamon, and opium to be taken on the occurrence of diarrhœa; and by this judicious precaution the men were inspired with confidence, the disease was kept in check, and collapse was prevented. Dr. M'William remarked, what I have mentioned as one of the features of choleraic diarrhœa, that the men under his charge were often attacked during the night.

supposed to have been induced in children. There were various modifications of treatment; but it would be inconsistent with the objects of this, which is a Sanitary Report, to enter into their consideration. I may, however, observe that the treatment of the premonitory diarrhœa by opium and stimulants was very extensively practised in Germany; and a combination of laudanum, peppermint, valerian, and ipecacuanha, forming what were called "Thielmann's Drops," after the physician of that name at St. Petersburg, obtained great repute.*

In choleraic diarrhœa, especially, there are four subordinate points of great importance: 1, the observance of the horizontal position, a precaution difficult to insure with labouring people, and yet of great consequence in cases of any severity; 2, the avoidance of all exposure to cold and chills, and the careful maintenance of the heat of the external surface, which is so often lowered in these attacks; 3, a rigid attention to diet, and that for some time after the diarrhœa has ceased; 4, the prevention, as far as possible, of fear, a passion which, during the epidemic, has often operated most perniciously.

I cannot better conclude this section than by quoting the observations of one of the most distinguished physicians in this country, illustrative of the whole subject of premonitory diarrhœa; remarking previously, that the experience of the late epidemic has shown how slow is the progress of knowledge, since it is obvious that, if the sound principles laid down years ago in the following extract had been universally acted on, the lives of thousands of victims who are now in the grave might have been spared. In allusion to the attack of cholera in 1832, Dr. Watson says,—

"The epidemic cholera made its attack in two different modes. In one it seized upon the patient suddenly, and without warning. This was comparatively rare. Much more commonly the specific symptoms were preceded, for some little time, even for some days perhaps, by diarrhœa. And this I take to be the most important practical fact that was ascertained during its prevalence among us. When the disease was once fairly formed, medicine had very little power over it, but in the preliminary stage of diarrhœa it was easily manageable. Unfortunately, people are inclined (especially those classes of the community among whom the cholera most raged) to regard a loose state of the bowels as salutary, and to make no complaint of it, and to do nothing for it; or, in other cases, they conceive it to proceed from some peccant matter within which requires to be carried off, and they take purgative medicines to get rid of it. Both of these are serious and often fatal mistakes. Mere neglect of the diarrhœa frequently permitted it to run into well-marked and uncontrollable cholera; and the employment of purgatives hastened or insured that catastrophe. The proper plan of proceeding, I am convinced, was to arrest the diarrhœa as soon as possible after its commencement by astringent aromatics and opiates. You may object, perhaps, that the cases that were cured in this way were not cases of cholera at all, and never would have been, but simply

* Dr. Graves describes a peculiar affection of the mucous membrane of the rectum, in which there are "white stools;" depending, not as was formerly thought on the presence of chyle, but on "the absence of bile and on the secretion of white viscid mucus from the intestines." It is interesting to learn that this affection, which is confined as to its product to the secretion from the small intestine in cholera, obstinately resists astringents, &c., but yields to nux vomica combined with hyoscyamus and opium. The examination of the discharges and of the mucous membrane would probably disclose a desquamation of the epithelium. (Clinical Lectures, vol. ii. p. 216.)

ordinary diarrhœa. It is impossible to prove the contrary, no doubt ; but the presumption is strong that the diarrhœa would, in many, and perhaps most instances, have run on, if not checked, into the more perilous form of the disease. In many places, when taught by experience, the authorities established diarrhœa dispensaries, to which those attacked by looseness of the bowels were warned and invited to apply, that the looseness might forthwith be corrected ; in many such places the cholera, which before had been cutting the inhabitants off by scores and hundreds, began instantly to decline in frequency. I venture to advise you, supposing the disease should reappear, or whenever in the autumn a suspicion arises that this form of cholera is present in the community, not to try, in cases of diarrhœa, to carry off the presumed offending matters, but to quiet the irritation and to stop the flux as soon as you can."

SECTION VII.

On the Neglect of Premonitory Diarrhœa by the Poor.

To those who are unacquainted with the actual facts of the case, the extent to which the poor during the epidemic neglected the premonitory diarrhœa must appear almost incredible. It has been shown in a preceding section that, notwithstanding the various measures adopted by the authorities to advertise the poor of the necessity of early application, patients were, as a rule, first seen by the medical officers when in collapse. This unhappy result was dependent on several distinct causes, which, in consideration of the great importance of the subject, may be here stated.

I. The most generally operative of these causes was unquestionably ignorance of the connexion existing between looseness of the bowels and cholera ; this prevailed far and wide, as is indicated in the reports of the visitors. The apparently slight nature of the attack, and especially *the absence of pain*, lulled thousands into a fatal apathy and security. Mr. *Liddle*, whose evidence is particularly of importance, since, in addition to the experience he obtained as one of the medical inspectors, he possesses that acquired as one of the medical officers of Whitechapel Union, observes—

"It is a well-known fact that the poor would not of themselves make early application for medical advice during the premonitory stage of cholera. In some instances, so slightly did they consider the warning given them by the looseness of bowels, that this was denied when the visitors called ; and only when collapse supervened did they acknowledge that diarrhœa had existed, saying 'they thought it was of no moment, as they did not feel ill.'"

Dr. *Gavin* says—

"Previous to the house-visitation, few poor persons were found who were aware that diarrhœa was a premonitory symptom of cholera ; if asked if any person were ill, the almost invariable answer was 'No, but my husband or child has got a very bad bowel complaint.' One reason for this apathy consists in the belief of the poor that everything of the kind 'will work itself off ;' this belief probably arising from the frequency of diarrhœa among them."

Mr. *Ferguson*, one of the visitors of Lambeth, says—

“For a long time, especially till the house-visitation was fairly in work, it was astounding to find to what an extent the poor would allow diarrhœa to go on unchecked. I used to imagine there was a peculiar moral obliquity about persons so attacked, for it was with difficulty I could get information from the persons themselves as to their condition, and usually discovered it from another person in the house. It was no unusual thing to find a person having five or six stools in a forenoon, taking no notice of it and not seeking for any relief.”

Mr. *Welch* states he discovered an elderly woman who had had diarrhœa ten days, and who, although frequently so advised, refused to apply for any medical advice; she was subsequently found in a state of collapse and died. Mr. *Adley*, one of the visitors in Bethnal Green, says—

“I have often met with cases where constant diarrhœa had been allowed to continue upwards of a month, without application for medical relief.”

Mr. *Walsh*, one of the medical inspectors, says—

“The apathy of the people as to any danger from diarrhœa was very general; they seldom applied for relief till cramps and vomiting had come on. Rice-water purging was often neglected. When handbills had been distributed, this was less the case; but abundant instances of it were seen to the last.”

On visiting one of the courts of Lambeth, where the disease had fearfully raged, I was told by a poor woman that she had lost her grown-up daughter; and on my inquiring if she had suffered previously from looseness of the bowels, she said, “Yes, for several days;” and being further asked why they did not apply for medicine, the answer was, “Oh! there was no pain, and we thought nothing of it.” Mr. *Benington*, one of the assistant medical officers of Lambeth, reported to Dr. Gavin that he lost 82 cases of cholera, in every one of which there had been previous neglected diarrhœa, of a duration sufficient to have afforded ample opportunity to secure the safety of the patient; he further adds—

“In no one instance did a case of diarrhœa pass into cholera under my treatment; nor was I ever called to a case of cholera in which the premonitory diarrhœa had been prescribed for by the house visitor.”

All these, and a multitude of similar cases which might be adduced, occurred, it must be recollected, after the epidemic had been raging for weeks, and when handbills and placards had been freely distributed.

II. Another very fertile source of neglect was the aversion felt by a large class of the poor, more especially in the more populous and impoverished districts, whose straitened circumstances at the same time made it difficult for them to pay for medicine and advice, to apply for parochial medical aid. This feeling, which, according to the reports of the visitors, is most deeply seated, appears to depend on several causes, such as the loss of time, and consequently loss of wages, in procuring orders and obtaining medicines; the unkindness shown in some instances by petty parish officers; and the conviction that the medicines furnished are selected rather for their cheapness than their efficiency. However little foundation there may be for this feeling, the

poor, who are close observers of any distinction of this kind, missing that neatness in the preparation of the medicine which they regard as a test of its goodness, are influenced by this prejudice to a considerable extent. But another and a deeper feeling is that strong aversion existing among the independent and industrious poor to the receipt of any aid which may seem to convert them into paupers. In some parishes the necessity of obtaining an order was entirely suspended; in many others, however, orders were still required; and this operated most injuriously in repelling those who were in want of medical aid. I shall have occasion to refer again to this subject in a future section. The following are a few specimens taken from the statements of the visitors. Mr. *Ayling* says,—

“I have oftentimes heard the remark among the poor, ‘I would sooner die than go to the parish doctor.’”

Mr. *Allen* says,—

“The poor have a general antipathy to apply to the parish medical men, and say they would rather suffer anything first.”

Dr. *Baylis* states,—

“They generally suffer a vast amount of sickness before applying to the parish for relief.”

Mr. *L. Barnett*, who is conversant with the system of medical relief, remarks,—

“The term union or parish doctor is in the highest degree disliked by the poor; and I may here state that during my visitation I never made use of the term ‘union,’ for, had I done so, my medicines would have troubled no one but myself who carried them.”

Dr. *Gavin* remarks on this point,—

“One of the great advantages which was secured by the house visitation was that it came from a central and governmental board; the people were charmed with this attention on the part of Government, and contrasted it favourably with the neglect and indifference of the parochial authorities. Had the visitation come from the parochial authorities, or rather had the poor understood that the visitors were parochial agents, the visitation would have been received with dislike in place of favour. I never in fact was ill received in the numerous sanitary investigations which I have made, but when I have recommended the poor to apply to the district medical officer.”

I can myself to some extent corroborate this statement, as it particularly struck me, in visiting some of the most afflicted districts, that the people spoke of the visitors, and evidently with satisfaction, as belonging to the Board of Health.

The facts just stated demand the serious attention of all who are interested, not merely in the welfare of the poor, but in the reduction of the parochial expenditure; since there is abundant evidence to show that a vast pecuniary sacrifice is incurred by the neglect so general among the poor of the primary invasion of disease, which leads directly and inevitably to much unnecessarily prolonged sickness and increased mortality, both imposing a heavy tax on the ratepayers. This subject, relating to the early detection and treatment of disease among the poor,

is so important, that I shall briefly return to it before concluding the present Report.

III. It will be at once apparent that a large number of diarrhoeal attacks must have been neglected, and that almost of necessity, by persons being seized when engaged at their work, and when absent from home. These persons, returning in the evening, usually delayed obtaining aid, and were often seized in the night with cholera; whilst others, attacked with diarrhoea in the early morning, just before going to their daily avocation, could only have obtained medical advice by sacrificing a part of a day's employment, and in this way numerous cases were neglected, and often with the most fatal results.

IV. Various other subordinate causes led to the neglect or concealment of diarrhoea, even when express inquiries were instituted. Thus in workhouses the fear of being placed on sick diet operated in some instances, of which the following is a specimen:—Several deaths occurred in a large workhouse, where, notwithstanding notice was carefully given to all who had diarrhoea that immediate application should be made for medicine, which was kept in readiness, attacks of cholera still took place, in which it was ascertained there had been neglected bowel complaint. Adopting the plan pursued in India, where, when cholera breaks out among the troops, sentinels are placed over the privies to detect any one suffering with diarrhoea, I advised that the water-closet should be watched. On the first day several persons with relaxation were thus discovered; and on being questioned, admitted that they had concealed its existence lest they should be placed on sick diet. It may not be out of place to mention that one of the guardians of this parish stated in a public inquiry that after this precaution not another attack of cholera took place. A somewhat similar instance is mentioned by Mr. Liddle, in a workhouse of one of the parishes which he superintended, where the medical officer denied the existence of diarrhoea among the inmates, but which was detected by placing a watch over the water-closet. Dr. Gavin relates a similar case in a workhouse where there was a serious mortality from cholera, and in which the amount of diarrhoea, which was very large, was unknown to the attendant surgeon.

SECTION VIII.

Measures adopted by the Boards of Guardians during the late Epidemic.

IN any Report professing to give a description of the late epidemic, it must be obvious that the measures adopted by the various Boards of Guardians (to whom, as will immediately appear, extensive powers were intrusted) to meet and control it ought to form a very important feature of such a document. In the present instance there are many circumstances which particularly indicate the necessity of entering into this subject; among the foremost of which is the fact, so distinctly

proved by the extended experience of the General Board of Health, that in a great number of instances the proceedings of the local authorities were altogether inadequate for insuring those prompt, comprehensive, and vigorous measures so urgently demanded in the presence of a great and destructive epidemic like malignant cholera.

Having witnessed the lamentable results of those proceedings; knowing that the health, the lives, and the happiness of the labouring classes of this great city are immediately and deeply concerned in the subjects about to be discussed; and [above all considering, that, if our poorer fellow-citizens are to be guarded by sanitary measures against the never-ceasing ravages of typhus, small-pox, and other destructive but preventible diseases, a desideratum infinitely more important than protection from the occasional invasions of cholera, some more efficient machinery than has hitherto been employed must be devised,—I am impelled by an imperative sense of duty to enter upon the discussion of topics I would, if permissible, have willingly avoided.

But before doing this there are some preliminary points, which, from their great importance, will require notice.

As London and its vicinity are excepted from the operation of the Public Health Act, all the measures calculated to arrest the progress of cholera in the metropolis depended on the “Act for Removal of Nuisances and Prevention of Contagious Diseases.” The provisions of this enactment, so far as the Board of Health is concerned, apply so long only as they are put in force by an order of the Privy Council, which order must be renewed every six months. When thus in operation, the General Board is authorized to issue such regulations for the prevention or mitigation of epidemic, endemic, or contagious diseases, as the Board shall think fit; and they are further empowered to require the guardians of the poor to put such measures into execution. But in connexion with this point, it is necessary to explain a circumstance which led, in various instances, to the most injurious results. This enactment not only contemplates the guardians of the poor as the executive body for the removal of nuisances and the cleansing of streets, &c., but also various other local authorities are named, such as the town council, trustees or commissioners for draining, paving, lighting, and cleansing any city, town, borough, or place; and also commissioners of sewers. Divided powers, and consequently a divided responsibility, are thus created; and as in most of the metropolitan unions and parishes there exist, independently of the guardians of the poor, such local bodies for paving, lighting, and other purposes, it is not surprising that, when regulations were issued by the Board of Health, such of them as related to external cleansing and the removal of nuisances were considered by the guardians as appertaining to the authorities specially charged with such matters. It is true the Act provides that, where there is default or delay in the execution of the regulations by the bodies above named, the responsibility shall fall on the guardians; but in the absence of any officer or officers to see to the execution of the directions of the Board of Health, the enforcement of them was, under such circumstances, difficult, or rather impossible.

The following is a case in point:—On the 19th of November, 1848,

up to which time seven deaths from cholera had taken place in the Whitechapel Union, the guardians received from their medical officers lists of places where epidemic and infectious diseases had lately prevailed; upon which the Board resolved that their clerk should communicate the particulars of these Reports to the respective local Boards, and inform them that it became their duty to cleanse the places referred to once in every twenty-four hours. On December 21st, when, in consequence of 20 additional deaths having occurred, I visited this union, I found, on carefully inspecting it, that almost all the courts were still in a very dirty and filthy state; that in many of them foul water and black mud were accumulated and ordure lying about, so as still further to infect the air; that the privies were in a most disgusting state, and totally unfit for the use of human beings; and that, among many other nuisances, were two dung-heaps in Cartwright-street, Aldgate, close to Peter's-court, where there was at the time a case of cholera, which had been reported several times to the beadle by the medical officer, but without leading to the removal of the evil.

A similar instance of the evils springing from this divided responsibility occurred in another union, in connexion with a coroner's inquest, held on the body of a person who had died from cholera. The place where the person had lived was in a most filthy condition, with overflowing privies and obstructed drains, and had, indeed, attracted considerable attention: one of the medical officers had reported that it was ill paved, ill drained, and likely to be productive of disease. This Report was presented to the Board of Guardians before the attack of cholera occurred, and was by them referred to the Commissioners of Paving, which led to considerable delay, and in the interval the person was attacked and died.

"The Nuisances and Contagious Diseases Act" was, till amended at the end of the Session of 1849, clogged with another impediment to prompt action, a notice signed by two inhabitant-householders being required before the local authorities could proceed in certain cases to remove causes injurious to health. This condition often created difficulties, the persons who were the greatest sufferers being afraid to come forward lest they should give offence to their landlords.

It is also to be borne in mind that the Act of Parliament had only just come into operation (on September 4, 1848), and that the General Board of Health was scarcely formed, when cholera broke out in London, and that various new and important measures were to be instantly adopted and carried into effect by unpaid authorities not accustomed to such proceedings, and occupied moreover with other and onerous duties in respect to the relief of the poor. It has appeared to me proper to allude to these circumstances, as they doubtless operated in some degree as obstacles to speedy and efficient action; but they might, by zeal, have been overcome, and cannot be received as a valid reason for the great and general neglect of sanitary measures during the late epidemic.

Independently of the difficulties explained above, others, and of a most serious character, arose from the unfitness of the authorities charged with the administration of the Act of Parliament for the duties imposed upon them. By that enactment various measures are prescribed,

which interfere with private interests, and especially with interests which, in all parishes, but particularly in large and populous ones, are largely represented in Boards of Guardians. Thus, for example, in many instances, owners of small houses and cottage property, to which class of dwellings the provisions of the Act more particularly apply, are themselves members of such Boards; and when this is not the case, they can exert an influence not the less powerful because it is indirect. This interest often conspired to impede efficient sanitary measures, and even in cases where there was a general wish among the local authorities to effect improvement.

As the Boards of Guardians are subject to annual election by the ratepayers, an inclination to economize, as far as possible, the parish funds, is a natural and obvious result. This feeling was unhappily allowed very generally to operate during the prevalence of cholera, whenever the question was mooted as to the adoption of the several proceedings indicated by the Board of Health as essential for the protection of the public health.

Local interests even operated when cholera actually prevailed in a parish, the great apprehension being, that, if active and really efficient measures were adopted, the trade of the neighbourhood would suffer. In one instance, when the epidemic had extensively prevailed among the poor, its existence was denied and house-visitation resisted; till, after considerable delay and loss of life, a number of shopkeepers were attacked by the disease, and then all opposition ceased.

Another obstacle arose from the absence of that knowledge which is indispensable to the superintendence and execution of a code of sanitary regulations. Mr. Liddle, who is well acquainted with the parochial system, points out some of the injurious consequences springing from this cause, in the following extract from his Report:—

“Among the members of Boards of Guardians there is often an antagonist power at work which prevents proper attention being paid to the sanitary condition of the localities inhabited by the poor. Some of the guardians entertain the idea that the Inspector of Nuisances is only to visit those places when complaints are made by the poor people, or whenever the medical officers report that an epidemic, endemic, or contagious disease has appeared; while other members of the Board of Guardians, entertaining more enlightened views upon the subject, think it better to prevent disease by giving instructions to the Inspector of Nuisances to examine from time to time the different districts, to find out and remove all those causes which are likely to engender disease, and not to wait until disease has broken out and life been sacrificed. If the law does not give this power to the Board of Guardians, it ought to do so; the performance of sanitary duties ought not to be left to the mere chance of a decision of the majority of the Board, but the question of all preventive measures should be decided by the district officer of health. The expense of preventive measures is not always readily granted by the guardians of a union composed of several parishes, inasmuch as the sick become chargeable to the whole union, whereas the destitute applying for relief are a charge upon the parish. If the casual sick were to be made a parochial instead of a union charge, more care I think would be evinced by the Boards of Guardians to prevent disease.”

Throughout the epidemic, another great evil arose from the delay interposed with respect to active measures of relief. The Boards of Guardians usually meet once a-week; and till towards the close of the

disease, no arrangement was made to secure more prompt action. Owing to this circumstance, and to other sources of delay, much valuable time was lost in all parts of London; which, in such a pestilence, was equivalent to a considerable sacrifice of life.

The last and the most influential of the causes which operated injuriously during the late epidemic, and the existence of which there was, from first to last and day by day, reason to regret, was the want of proper power on the part of the medical officers of the several unions and parishes, on the one hand, to initiate and carry out those general and enlightened measures of sanitary improvement by which the progress of the epidemic might have been controlled; and on the other, to provide suitable aid for the relief of persons actually attacked. The Act of Parliament gave no power to the parochial surgeons to act without the previous direction and sanction of the guardians; and even if such authority had been granted, the existing relations between the medical officers and the local authorities are of such a nature, that the former would not have been in a position sufficiently independent to direct and put into operation the various measures so urgently demanded for the safety of the poor.

The powers bestowed on the General Board of Health by "the Nuisances and Contagious Diseases Act" are of a twofold order. The first, and by far the most important—for they strike at the very root of the evil—are those which relate to the removal of nuisances, the cleansing of streets, alleys, and courts; the cleansing, purifying, and whitewashing of all dwelling-houses; the cleansing of foul drains, ditches, and cesspools; and in fact to the removal of all causes injurious to the public health, so far as they come within the operation of the Act. The powers and duties of the second class relate to the limitation and prevention of epidemic or contagious diseases, on the actual occurrence of which, in any parish or union, the guardians are required to provide such additional medical officers, and to adopt such other measures, as may be needful. Ample powers were given to enforce these measures; if, for example, the owners of houses neglected to put them into a proper state, the guardians could order the necessary works to be done and compel repayment; or, if the owners were too poor to pay, then the expenses could be charged to the poor-rates, out of which were also to be defrayed any outlay rendered necessary for cleansing streets, courts, and alleys.

I. Proceedings of the Guardians in reference to Sanitary Measures.

Regulations of the General Board of Health.—On the 6th of November, 1848, when some cases of cholera had already occurred in London and in several towns of England and Scotland, the General Board of Health issued a series of regulations to the guardians of the poor throughout England, of a most comprehensive, and, as I would affirm, of a most efficient character. Among these regulations appear the following:—

"I. And we do further authorize and require the guardians to direct their clerk to make out from the Register of Deaths or from the District Medical Relief Books, and from any public books or other sources from which information may be obtained within the union, a list of places where epidemic, endemic, and contagious diseases have of late been frequent.

“II. And we authorize and require such guardians to cause the medical officers employed by them, or specially appointed for the purpose, to visit the places of which a list shall be made out as aforesaid, and all such neighbouring and other places within such union as shall appear to such medical officers (from being under like circumstances with places included in such list or otherwise) to require visitation or examination.

“III. And each such medical officer shall, where it may be necessary, certify, in writing, to the board of guardians, and to the surveyors, trustees, occupiers, or others required to execute these directions and regulations, all such places as are in a state dangerous to health, or need frequent and effectual cleansing by way of preservation against disease, and such dwelling-houses as are in a filthy and unwholesome condition, and all such nuisances and matters injurious to health as ought to be abated, cleansed, and removed under these regulations.”

By the first of these connected regulations a certain and simple clue is indicated for detecting places where preventible disease exists; by the second, the only persons capable of discovering the various causes of removable disease—namely, medical practitioners—are to inspect the infected localities; whilst by the third direction provision is made for the guardians receiving clear and exact information, as to the remedial measures required for the protection of the public against destructive epidemic disease. Other regulations were at the same time issued, directing the guardians to take the necessary measures for the cleansing and purifying of dwellings; abating and removing nuisances; and generally for the removal of all matters injurious to health.*

Inattention of Guardians to these Regulations.—It must be obvious to all unprejudiced persons, that, if any combined and efficient efforts were to be made by the agency of sanitary amelioration, to guard the population of this vast metropolis from the ravages of the destructive pestilence with which it was at the period in question threatened, no initiatory measures could be better adapted to secure that all-important object than those set forth in the above regulations; and yet I am bound to state that, with some few exceptions, they were disregarded by the various boards of guardians in London and its neighbourhood for many months after the cholera had given unmistakeable evidence of its presence, by severe though restricted outbreaks in divers metropolitan parishes. In spite of these regulations and significant warnings much precious time was thus irrevocably lost; no systematic sanitary precautions were adopted; and I consequently found on visiting various localities on the reappearance of the disease in June and July, as the medical visitors did subsequently in September, that foul and obstructed drains, filthy houses, and overflowing cesspools, were as rife as they were before Christmas, when the epidemic first broke out. This was even the case in the various spots where cholera had formerly prevailed, and where the whole class of epidemic diseases had again and again recurred.

Medical Officers not consulted.—On seeking to learn the reason why the preventive sanitary measures prescribed by the General Board had in so many instances been neglected, one of the most fundamental

* See Official Circular of the General Board of Health. No. 2, pp. 18 et seq.

omissions connected with the local management of the late epidemic, and to which, according to my judgment, by far the larger portion of the evils that followed ought to be attributed, came to light. *The parochial medical officers, with some few exceptions, had neither been consulted by the guardians on the measures required at such a crisis, nor authorized to examine into the causes affecting the public health,* and this notwithstanding the express requirement contained in the official regulations, that the guardians should "cause the medical officers employed by them, or specially appointed for the purpose," to visit all places where epidemic, endemic, and contagious diseases had of late prevailed, and report on the sanitary precautions required.

Fully to appreciate the fatal consequences of a negligence thus arising and persisted in till thousands had perished, it is essential to explain what is familiar to all who are practically acquainted with the progress of epidemic cholera, that the main attacks of the pestilence fall upon precisely the same streets, courts, houses, and even rooms, in which during ordinary seasons fever and other forms of zymotic disease specially prevail, or, in general terms, that the habitat of cholera and of fever is one and the same. So early as the beginning of November, 1848,* the General Board of Health gave ample and distinct information upon this all-important point; it published a large body of medical evidence, derived from the most competent observers, to show that, as the neglected and filthy parts of a town,—the parts unvisited by the scavenger, the parts unsewered and undrained, the parts having no proper supply of water for washing away their filth or for domestic use,—were the chosen spots where typhus prevails, and decimates the population, so were they the special seat of cholera; it pointed out that this had been universally proved in respect of the epidemic of 1832; and in order to ascertain if, as could scarcely be doubted, the same law would be again observed in 1848, the General Board instituted extensive inquiries, and all of which distinctly demonstrated that the march and progress of cholera, so far as it had then extended, was, as in the former attack, in the midst of the fever districts.

Now these districts were as familiar to the medical officers of the metropolis as if they had been marked out on a map; each and all of these gentlemen, had they been required to lay before the guardians the information they possessed, could, before a single case of cholera had occurred in their districts, have placed their finger upon the very spots and houses which, supposing no ameliorations to be effected, would furnish the victims of the coming disease.

But, unhappily, after all the information that had been collected and published, after the repeated efforts made by the General Board to ensure to the public the benefit and protection of well-considered and efficient sanitary precautions, the lessons of experience were but too generally neglected by the authorities more especially bound to adopt them; and the population of London, and specially the poorer classes

* See Official Circular, No. 2, p. 25. It is proper to remark that in the earlier Reports of the Metropolitan Sanitary Commissioners, among whom were comprised the members of the General Board of Health, the same kind of evidence and the same conclusions were announced.

of it, found themselves, when cholera began to rage among them, as unprepared to meet it as in 1832, if they were not, owing to increased numbers, even in a worse position. It is not intended by this to deny that some measures of cleansing, &c., were adopted; but they were limited in their application, insufficient in their nature, and devised by no competent authority. In some parishes more extensive, but still partial, ameliorations were effected.

Instances of neglect.—It has been stated that this neglect of comprehensive sanitary measures was general, and instances might be adduced from every part of the metropolis of the evils resulting from it. The limits of this Report will, however, only allow me to adduce one or two examples. In the Holborn union—where, as if a warning had been sent to awaken the watchfulness of the authorities, cholera having appeared for a time in the preceding January and February, when it carried off 22 persons, and then ceased for three whole months—I found, on making inquiries in the month of August, at a time when 107 deaths from cholera had already occurred, that the medical officers had not been required to visit and report upon the places in which epidemic and infectious diseases had prevailed; and yet it was stated to me by the district surgeons that there were in the union places in which the houses were in so filthy a state as to be unfit for human habitation; that in one of these houses in Tindall's-buildings as many as 15 or 20 cases of cholera had occurred, whilst in others several members of the same families had been attacked in succession. It was the opinion of these gentlemen that, by medical inspection and proper measures, the sanitary state of these localities would have been improved; but, beyond some partial cleansing, no effectual remedies had been applied.

Another specimen of the same kind of neglect, involving also an entire disregard of the precautionary measures of the General Board of Health, may be selected from a parish which has suffered most severely, namely, St. George's, Southwark. The guardians in this parish had earlier warning of the approaching evil than in the case of the Holburn union, for it was one of the very first in which cholera appeared in the metropolis, the first death in it being registered in the week ending October 21, 1848. Nor were the indications of a severe outbreak wanting, since, at a time when 77 out of the 135 registration districts of London and its suburbs were entirely free from cholera deaths, and many of the other localities were only slightly visited, there were, in the Kent-road district of St. George's parish, absolutely and proportionately to the population, more deaths in the week ending November 4, 1848—namely, 9—than in any other district in the metropolis up to the same date. In consequence of an outbreak of cholera in a place called the Mint, in February, 1849, I received instructions on March 7th to visit this parish, when, from the statement of the Chairman, it appeared that up to that date the guardians had not directed their medical officers to visit, inspect, and report upon the localities in which epidemic or infectious diseases had lately prevailed. And yet there was abundant evidence to show such diseases were at that time rife in different parts of the parish: thus one of the surgeons states in evidence that “fever has prevailed more or less in different parts of his district; that in certain localities it is rarely absent; and

that these places are in a bad condition as to cleanliness, drainage, &c.:" whilst one of the relieving officers, who had been appointed an inspector of nuisances, stated that there had been in the preceding three weeks a good deal of fever in his district, including the Mint, and that in one house the whole family had been seriously ill from that disease. Four inspectors of nuisances, consisting of the relieving officers, had been previously appointed; but such persons, possessing no professional knowledge, were not competent to the discharge of the duties contemplated by the Board of Health. Subsequently to my visit the medical officers were appointed to report upon all places requiring sanitary measures.

It has been above noticed that, when sanitary precautions were adopted, they were partial and inefficient. Thus in Whitechapel, where the guardians, as already stated, initiated some proceedings, other great evils remained. To show the injurious effects of such omissions, the example of Bakers' Arms-yard may be mentioned, where I found in one of the houses what had been the room of the ground-floor converted into a stable; whilst in the room above, and thus exposed to the poisonous exhalations, lived a man, his wife, and five children, all the latter of whom four months before had, as the mother informed me, suffered from fever. Now, can it be doubted that persons thus situated were in a state hazardous as regarded an attack of cholera, or that a house with its ground-floor occupied as a stable did not come within the express meaning of the Act, which enjoins the guardians to proceed against the owner of any premises upon which "any accumulation of dung, manure, offal, filth, refuse, or other matter or thing, are or is kept, so as to be a nuisance to or injurious to the health of any persons"?

If further proof were needed in support of the position I have advanced, it may be found in the evidence extracted in a preceding section from the reports of the medical inspectors. The amount of sanitary evils of every kind detected wherever the system of house visitation was applied, and which till then had been unnoticed, is in fact one of the strongest proofs that could be adduced to show the necessity of efficient and constant medical inspection of the populous districts of London. In order to demonstrate that these evils, by which the poor are habitually surrounded, and from which, in the existing state of things, it is not possible for them to escape, are general, some additional extracts may be made from the evidence of the medical visitors. Mr. Cleave states, of Bethnal-green, that he has seen the water which the poor were obliged to use, green, and smelling most disagreeably. Mr. Vivian, another visitor of the same district, says the landlords never think of making any repairs as long as they can find tenants to occupy their premises in their present miserable condition; in two instances, complaints having been made that the back yards were overflowing from the cesspools and want of drainage, a kind of gutter was made across the floor of the dwelling, covered only by the boards, liable to overflow, and exhaling the most pestilential odour. Mr. Powell reports of Clerkenwell,—

"Insufficient supply of water, and its results, dirt and filthy habits; bad drainage; dust not removed for several weeks; want of receptacles for dust;

cesspools full and eliminating most noxious effluvia; crowded habitations."

Mr. *Molloy* reports also of Clerkenwell,—

"Long-standing collections of dust, which the contractors had failed to remove, and refusals by the men to do so without a gratuity, which the poor were not always able to pay."

This is an evil which has repeatedly come under my own knowledge, and of which the poor make most urgent complaints.

In Islington Mr. *Campbell* reports,—

"Bad and defective drainage; insufficient accommodation for the poor; close and confined lanes, courts, and alleys; a defective and vitiated supply of water; unemptied cesspools; water-closets (privies) common to whole courts; pigs kept in confined yards."

Mr. *Scott*, another visitor in Islington:—

"Bad drainage; foul privies; ill-ventilated houses; insufficiency of water; cesspools; open ditches."

Of Whitechapel, Mr. *Liddle* gives the following as the summary of the information received from the visitors:—

"Insufficient supply of water, overflowing privies, dust-heaps, filthy houses, want of privies, dilapidated houses, rain coming through the roofs, privies in the cellars, the effluvium of which penetrating into every room of the house; stagnant water in cellars, matter of cesspools soaking into cellars, and staircase almost impassable in consequence; matter oozing through the walls of houses and into sitting-rooms; bone-boiling, piggeries. A lower room in Whitehorse-court, Mile End New Town, is described by Mr. Carpue as being in a most disgusting state; and about 14 to 20 persons, boys and girls, living and sleeping there."

Inspectors of Nuisances appointed by the Guardians.—In several unions and parishes inspectors of nuisances were appointed, in many instances, however, in an advanced stage of the epidemic, and in consequence of the special order of the General Board; and in some cases committees of the guardians were also constituted for the purpose of inspecting the various districts. By these and other means numerous nuisances were removed; courts and alleys were in some districts better cleansed; foul privies and cesspools were in some localities repaired; and whitewashing and greater cleanliness enforced: thus the trustees of Whitechapel parish, a body distinct from the guardians, since October, 1848, took legal proceedings against 384 persons for nuisances of various kinds. But speaking generally, the cleansing operations were altogether inadequate to the emergency. With respect to the inspectors of nuisances, it is also essential to point out several fundamental defects often connected with their appointment. It is evident, from all the information I have received, that, with some limited exceptions, the guardians, in appointing these inspectors, intended they should, in addition to the duties properly belonging to their office, perform those which were assigned by the Board of Health to the medical officers. Now, although such officials would, if properly selected and under medical direction, render valuable service, it is requisite, for the protection of the public health, and especially for the welfare of the swarming population of the courts and alleys of the metropolis, distinctly to explain that they

do not possess the knowledge requisite for the efficient discharge of the important duties which devolve on an officer of health; to expect of such persons the detection of the multitudinous causes of the diseases which decimate the poorer classes of the community is therefore altogether futile.

But, besides the mischief arising from the cause just stated, there is abundant evidence to show that these officers are frequently not in a position compatible with the efficient discharge of the duties properly belonging to them. They are, and, according to the existing state of the law, of necessity, appointed by the Board of Guardians, under whom they are very often already engaged in the capacity of relieving officers, beadles, &c. Now, it happens, and especially in the most populous localities, that the landlords of the small houses let out to the poor, and which are the very class of dwellings most urgently demanding sanitary reformation, are members of the Boards making the appointment; and it therefore cannot be a matter of surprise if, under the circumstances stated, as Dr. Gavin mentions in his Report,—

“the men selected for the office should be those accessible to the influence of these parties, and who would in reality be blind to the offences of their immediate employers.”

Another of the medical inspectors, Mr. *Liddle*, gives many individual instances of the benefits derived from sanitary improvements in Whitechapel, Clerkenwell, &c., when properly directed. The mode of procedure adopted by this gentleman was as follows:—

“In order to bring the sanitary condition of the localities of the poor under the more immediate observation of the local authorities, I directed the visitors to record all nuisances and supposed causes of disease they met with in the course of their visitation, and I requested the Inspector of Nuisances to meet me daily at the time when the visitors attended with their reports. I then gave instructions to the Inspector of Nuisances to copy into a book prepared for the purpose all nuisances and complaints of the poor people; all these complaints were entered on one side of the Inspector's book, and on the other side he was directed to enter how they were disposed of. This book was presented to me daily, and it was laid before the Sanitary Committee at their meeting.”

“So long as the Inspector of Nuisances,” reports Mr. Liddle, “is responsible to a superintending medical officer, but no longer, will the services of such an agent be useful. The various interests of the different members of the local Boards will at times bias the judgment of their servants, and hence it is absolutely necessary for the security of the health of the people that the Inspector of Nuisances should submit his reports to an officer totally independent of all local influence.”

Although it unfortunately happened that in those very districts where the vigilant, sustained, and uncompromising discharge of their duties by the inspectors of nuisances was most required, there was often the greatest neglect, yet the experience of other and richer parishes, where such influence is more difficult of exercise, shows that these officers are capable of rendering, under medical direction, very valuable services. Thus, in St. George's, Hanover-square, Dr. Lewis reports that

“Much had been done in this parish towards improving the state of the districts during the previous twelve months, the authorities having employed

a very active Inspector of Nuisances. Any nuisances discovered by the medical visitors in the day were reported in the course of the evening to the Inspector of Nuisances, who had instructions to visit the locality immediately afterwards: in this way many evils were brought to light and corrected."

But even in this locality, where so much has been done, much more remains to be accomplished. Dr. Lewis states that

"A very large number of these receptacles (cesspools) still disgrace this wealthy parish. Many of the best streets in the district have houses built over these poison-yielding pits, as New Bond-street, Oxford-street, Mount-street, Hertford-street, Mayfair, &c. Many of the causes of unhealthiness still remain unremoved in the parish; in many parts there is scarcely a house without some latent cause of ill health in or adjoining it. The mere casual inspection that the parish receives by the present system will not, in my opinion, discover all the removable evils under which it labours in 20 years. Many sanitary evils exist which do not strike the eye of unprofessional persons as such, but which a medical man would quickly perceive to bear the relation to disease of cause to effect. I am of opinion that a modified system of house-to-house visitation by a medical man, invested with the necessary authority for removing nuisances prejudicial to the health of the population, would do more towards relieving parochial rates than any other means. Zymotic diseases would be comparatively unknown; typhus, diarrhœa, and cholera might almost be extinguished as endemics and epidemics; and although some cases would occur here and there of these diseases, they would be isolated cases, and would find no nidus to favour their spreading over entire districts, as is the case at present."

II.—*Proceedings of the Guardians in reference to the Medical Aid provided on the outbreak of Cholera.*

It has been shown in a preceding page, that, irrespective of preventive sanitary measures, the Legislature has assigned to the guardians of the poor special and important duties on the actual occurrence of any epidemic or infectious disease. And here I may be permitted to direct special attention to the spirit, and indeed to the very wording, of the enactment; for upon the right apprehension of this all-important point hinges a large part of the merits of the inquiry now entered upon. The words of the statute then are these: "The General Board of Health may issue such regulations as the said Board shall think fit for the prevention, as far as possible, or mitigation, of epidemic, endemic, or contagious diseases; and may by any such directions and regulations authorise and require the guardians of the poor, by themselves or their officers, or by officers specially appointed in this behalf, to provide for the dispensing of medicines, and for affording to persons afflicted by or threatened with such epidemic, endemic, or contagious diseases such medical aid as may be required."

Now it is evident from the whole tenor of this passage, that what was contemplated upon the outbreak of serious epidemic disease was not the employment by the guardians merely of their ordinary medical officers, but also of such extra medical aid as the emergency might demand. It is still more essential to point out that this aid is not simply to be provided for persons actually afflicted or attacked; but likewise for those who might be "*threatened* with such epidemic, endemic, or contagious disease," the main object in fact of sanitary

legislation being the *prevention* of disease. It must be further apparent to all unprejudiced persons that, if there ever were an occasion in which all the provisions of this enactment were to be put into active operation, it must have been on the advent to these shores of a disease which had already once traversed and desolated Europe; a disease which, regard being had to the number of its victims, and to the terror it has inspired, has no parallel save in the great pestilences and plagues of former ages; a disease, in fine, against which all enlightened Governments have deemed it to be their first duty to guard and shield their subjects by all the appliances, both of science and wealth, at their command. As the deepest interests of the public, and especially of the poor, are involved in this matter, and as it is a point of paramount importance to the cause of humanity that for the future there should be no recurrence of omissions and of neglect which have led to a large sacrifice of life, I am particularly concerned that on the one hand the principles enunciated by the General Board of Health as being alone applicable to the medical management of this destructive epidemic should be clearly apprehended; and on the other that the measures adopted by the boards of guardians, and so often persisted in, notwithstanding my urgent recommendations, and in some instances of the express orders of the General Board, should be as distinctly understood.

Principles enunciated by the General Board of Health.—Contemporaneously with the outbreak of cholera in this country, the General Board of Health proclaimed the principles upon which the preventive and other measures for meeting the epidemic ought to be conducted. Confidently assuming, what an ample experience has shown to be one of the most general laws of the disease, that cholera is, as a rule, preceded by premonitory diarrhœa, the General Board took this as the basis for all the proceedings of the guardians of the poor. In the document just referred to appears the following instruction:—

“It will be indispensable, therefore, on the first outbreak of cholera, that the local authorities should immediately make arrangements for daily house-to-house inspection of the poorer localities in their respective districts; this being the only practical means by which, in the most dangerous situations and among the most susceptible subjects, the existence of the premonitory symptom can be ascertained in time to administer the proper remedies, so as to arrest the progress of the disorder.”*

In this passage, thus promulgated when scarcely a single case had been reported as having arisen in this country, is enunciated what may be emphatically denominated the one principle for the successful management of cholera; namely, that as the disease is, as to the rule, preceded by diarrhœa, as this diarrhœa is, if seen early, most manageable, all the efforts of the local authorities should be directed to seeking out and promptly treating through proper medical agency all persons affected with the first or incipient stage. The epidemic has for this time run its course; the science of Europe has been exhausted, but in vain, to find a remedy for it; thousands have perished in spite of the most

* Notification of the General Board of Health, dated October 5th, 1848.

varied modes of treatment zealously and even tenaciously applied ; and now after this vast experience the plan of procedure thus laid down by the General Board has been shown, as will subsequently be established by a weight of evidence that nothing can shake, to be the only one calculated, so far as our present knowledge extends, to grapple with this fearful pestilence.

It is further to be observed that in all its proceedings the General Board has considered that the only method of carrying into practical operation the intentions of the Legislature as to the prevention and mitigation of cholera, as of other epidemic diseases, was through the agency of competent medical officers. Thus, by the regulations of November 6, 1848, as already stated, it was directed that the medical officer of every union and parish throughout the kingdom was to ascertain on the occurrence of epidemic disease the causes producing it ; he was to regulate the number of inmates in any room occupied by one family or more, in which epidemic or infectious disease might arise ; and in the event of the fatal termination of any cases of cholera or other epidemic disease in such rooms, he was to cause to be removed as speedily as possible either the corpse or the persons occupying and sleeping in such rooms till the corpse could be conveniently removed and properly interred ; in fine, the medical officer of the district was charged with the execution of the orders of the General Board for preventing the spread of cholera and other epidemic disease.

So strongly impressed was the General Board with the conviction that the public interests demanded that all the resources of the medical profession should, in such a visitation, be made available, that in the second notification, dated October 31, 1848, the following urgent recommendation was made to the guardians :—

“ It appears to the General Board of Health to be absolutely necessary, in the present emergency, to concentrate responsibility on the medical officers, and to intrust them with discretionary powers, because the rapidity of the course of cholera will not allow them to wait for direction from the guardians at their weekly meetings ; and seeing the many and arduous duties that devolve upon the medical officers, the General Board of Health cannot but express a hope that the remuneration of these officers will be more proportionate to the value of required services than it was upon the former occasion.”

From the preceding statement it will be seen that in these proceedings the General Board directed prompt, vigorous, and sustained efforts ; that it deprecated as the worst of all evils, in the presence of a disease which often carries off its victims in a few hours, all delays ; and that, by a maturely considered and complete code of regulations, it placed in the hands of the local authorities the best means which, from former experience, could be devised for controlling the destructive epidemic then commencing its attacks.

In turning to consider the measures adopted by the guardians, I am bound to state that, in the great majority of instances, all the essential regulations and instructions of the General Board were disregarded or directly rejected. The most serious, or rather, as it ought from its results to be called, the most fatal mistake which pervaded the

whole of these remedial measures, from first to last, was this:—the guardians—herein departing diametrically from the injunction of the General Board, that cases should be sought out—in all their arrangements acted upon the principle that the poor, when attacked, should apply to the medical officer, who thus, instead of discovering cases in their first incipient stage, waited for an application—a delay which led, as I am prepared to show, to the most fatal consequences. The evidence collected from all parts of the metropolis points but to one conclusion; the patients who suffered from cholera, and who were treated under the system of the guardians, were in the great majority of cases, seen for the first time by the medical officers when in complete or incipient collapse; when consequently the aid of medicine was almost as nothing; when, whatever mode of treatment was adopted, from 40 to 50 per cent. of those attacked would perish. So generally, or rather universally, was this the case, that on reflection I cannot recall the instance of a single parish or union in London where, so far as the proceedings of the local authorities were concerned, apart from the Board of Health, any plan was adopted for seeking out persons affected with the premonitory, first, and curable stage of cholera. That partial steps were taken—that the medical officers overtaxed their powers in the effort to supply assistance to the multitudinous sufferers—that they again and again visited the afflicted localities, is true; but, large as were the numbers relieved by their meritorious exertions, still larger numbers were overlooked, many of whom subsequently fell into collapse, and swelled the weekly tables of mortality.

It appears desirable, in consideration of the importance of this subject, to select a few of the statements received from the medical officers of the various parishes and unions, as they will place in a striking light the defects not merely of the course pursued by the guardians for affording medical relief, but also as regards their general management of the late epidemic.

ST. PANCRAS.—On August 23, 1849, Dr. Milroy, by direction of the General Board of Health, visited this parish, in order to ascertain the progress of the disease, and the measures adopted by the authorities to meet it. On this day Mr. *Eastcott*, surgeon of the central district, stated that

“three fatal cases of cholera had occurred in a house in Paradise-place; the family lived in a room over a very filthy stable, and the floor, being full of openings, readily admitted the foul effluvia to pass through; in addition to this nuisance there was a heap at the door, consisting of horse-dung and putrid fish.”

On August 30th Mr. *Eastcott* states,

“he had had 10 cases of malignant cholera since the 23rd; that there was a steady increase of diarrhœa, and that the attacks occurred in groups.”

On September 6th this gentleman stated to me that

“he had seen most of the cases of cholera for the first time when in collapse; that, according to his experience, cholera was preceded by diarrhœa; that no attempt had been made to visit from house to house; and that he had applied for nurses some days before, but none had been provided.”

Mr. *Tod* stated, on August 30th, that

"he had seen since the 23rd four cases of malignant cholera, all of which were in collapse when he was called in; three had died, and the fourth was under treatment; two of these occurred in the same room."

Mr. *Popham*, surgeon, of the East District,

"has had several cases of cholera since August 23rd; five cases occurred in one house; there is a family in every room in this house, and several of the inmates have been affected with diarrhœa; the occupants of the kitchen floor state that they cannot shut the windows at night from the horrible stench of the drains; wished to remove some of the inmates out of this house, but no house of refuge had been provided."

Dr. *Milroy* reports that

"No list of localities in which fever had prevailed had been made out by the clerk, as directed by the regulations of the Board of Health. Numerous streets were named to Dr. Milroy by the medical officers as being generally the seat of fever."

It is important to state the further proceedings of the guardians in this parish, where, in eight weeks—namely, from July 28th to September 22nd—no less than 239 persons died of cholera. On August 29th they appointed four medical assistants; but these were not sufficient to make a house visitation, and, as seen above, none was attempted. On September 12th one of the medical officers stated that four visitors would be required for his district alone. A special order of the General Board was subsequently sent, directing the appointment of four medical visitors; and on the 18th Mr. Liddle, who was then acting as medical inspector for that parish, attended the board of guardians, and strongly urged the necessity of the order being complied with. As this was resisted on the ground of the parish being in so healthy a state, though in the three preceding weeks, ending September 1st, 8th, and 15th, the deaths from cholera amounted, respectively, to 48, 50, and 40, Mr. *Liddle* requested that one of the medical officers should be called in, to whom he put the following questions:—

"Have you many cases of cholera?—Yes.

"Were they in a state of collapse when visited by you?—Yes.

"Had they diarrhœa previously?—Yes.

"Would the cases have proved fatal had you visited them during their diarrhœal stage?—In all probability their lives would have been saved."

Notwithstanding these representations, no appointment was made at this meeting, though subsequently a medical visitor was appointed to one of the districts.

BETHNAL GREEN.—A striking instance of ignorance on the part of the guardians as to the actual state of the disease in their own parish (which, as it had been ascertained by the inspector of the district, was suffering from choleraic diarrhœa) is recorded by Dr. Gavin with respect to Bethnal Green. In consequence of the great population of the parish, and the large number of poor inhabitants, the General Board issued a special order for the appointment of four additional medical visitors:—

"The board of guardians at first determined not to conform to the order of the General Board of Health, and rested their justification on the plea that choleraic disease had not then affected the other districts of Bethnal

Green. They denied that either cholera or diarrhœa prevailed there. The registrar's returns disproved the first plea; but it became necessary to disprove the second also. Accordingly I directed the four visitors then employed to visit next day, and attend to all cases in their districts which required to be seen, and then to employ the rest of the day in visiting those districts said to be unaffected and free from choleraic disease. In the evening the returns of the visitors exhibited no less than 211 cases of diarrhœa in the alleged healthy locality."

The result of this experiment was so evident, that the aid demanded could no longer be refused; but the evils of this procedure were too serious to pass by unnoticed. The order of the General Board was issued on the 10th of September; but the evidence of the official documents, the registrar's return, and the information acquired by an express investigation by the officer appointed to secure efficient aid to the suffering poor, being alike rejected, the order was not acted on till the 20th, thus allowing ten days to elapse in the midst of the epidemic, a delay which from experience it is certain must have caused a sacrifice of life. But the mischief did not cease here, for, owing to the withdrawal of the visitors already appointed only for a part of one day from their district, it was found on their return that several cases of diarrhœa being neglected had gone on into approaching collapse, thus placing the patients in imminent danger. The question naturally suggests itself, if this amount of mischief happened in a single district of a single parish in a portion of one day, what must have been the sacrifice of life throughout the metropolis when the poor were left so much to their own judgment as to the necessity of applying for medical aid.

ST. LEONARD'S, SHOREDITCH.—On August 3rd, 1849, Mr. Burchell, one of the surgeons, stated he had attended in July about six cases of developed cholera; and that in the preceding week there had been an increase in the attacks:—

"Saw all the cholera cases first in collapse, though all had had preceding diarrhœa. The poor, when suffering from bowel complaint, often neglect it till it becomes serious. The ordinary duties he has to discharge entirely prevent him visiting the affected districts with the view of discovering diarrhœa. Is often called up at night."

On the 14th August this gentleman, who was overwhelmed with incessant labour, having had, as he informed me, at least 100 applications before 11 A.M., and having been called up six times in the previous night, reported that the cases of cholera, of which he had attended five the preceding day, were still seen first when in collapse. Another surgeon, who was acting as one of the medical officers, Mr. Bower, also stated it was very difficult to induce the poor to apply early in bowel complaints, or even to admit or understand that relaxation of the bowels is any attack at all. Up to this date no extra medical assistants had been appointed.

ST. GEORGE'S-IN-THE-EAST.—Mr. Wilson, on July 27th, stated he had attended, since the reappearance of the cholera, about 14 cases, of which 9 were fatal: all these cases had premonitory diarrhœa, which had been neglected. Many of the poor disregard the attack for several days, till it becomes so bad they are compelled to apply for relief: no case of diarrhœa which was seen early had passed into cholera. Another

surgeon, Mr. Rygate (a partner of one of the medical officers), stated that several cases of cholera had occurred in the district of St. Paul's, all of which had premonitory symptoms, which the poor neglected: "in all the cases of diarrhœa, when seen early, the attack was controllable."

ST. OLAVE'S UNION.—The medical officers of this union stated in evidence that the cases of cholera attended by them were first seen either in incipient or complete collapse. Thus Mr. *Bayfield*, on August 10th, stated that—

"he had last week seven cases of developed cholera; all of these, with one exception, had had preceding diarrhœa of some hours' or of one or two days' duration. They had not been treated for diarrhœa. First saw them in consequence of application."

Mr. Leadam had, from July 28th, 22 cases of cholera, all of which were seen for the first time in incipient or complete collapse, and of which six were fatal. The evidence of these gentlemen, and of two extra surgeons appointed by the guardians, shows, however, the vast importance of early treatment. Thus Mr. Leadam states he had attended about 800 cases of diarrhœa in July and August, of which only two went on to cholera. Mr. Bayfield had seen upwards of 200 similar cases, and of those treated early not one had passed into collapse. Mr. Viner had attended about 400 cases of diarrhœa, including many of rice-water purging and vomiting, and of these only two passed into cholera; whilst Mr. Russell, who had attended from 20 to 25 cases of diarrhœa daily, states that if seen early all are curable. These gentlemen further stated, what is in keeping with all experience, that the poor often neglected to apply; so that in many instances diarrhœa had existed two or three days without anything being done to arrest it.

These instances of the unhappy consequences resulting from the measures adopted by the local authorities may be concluded by the case of one of the most populous unions in London, and where the disease prevailed severely. This case will also serve to illustrate a species of intimidation exercised not unfrequently by the guardians over their medical officers in matters strictly pertaining to their professional duties, which, in my opinion, is totally incompatible with the welfare of the poor: it is, indeed, this consideration, joined to a sense of the duties which I have to perform, that alone could induce me to publish these painful details. Finding towards the end of July that a decided increase of the epidemic had taken place, I saw one of the surgeons who had charge of a most unhealthy district. In the preceding week he had, in addition to his ordinary duties, 12 cases of confirmed cholera; he had also to give assistance to a multitude of very severe cases of choleraic diarrhœa, of which he had 20 on the previous day. Some time afterwards, the epidemic having greatly increased, I again saw this surgeon, when he stated that there had been an immense number of diarrhœal cases; that in the 13 days preceding, he had had 41 cases of developed cholera; that he had been called to three such cases before six A. M. on the day of my visit; that he had seen 41 cholera cases for the first time, when either in incipient or complete collapse, and in consequence of application, he having no time to attempt a systematic house visitation; that in all these cases there had been premonitory diarrhœa, in some of them for several days; that diarrhœal cases, when

seen early, were so capable of being controlled, that he had not seen one thus treated pass into collapse; and, lastly, that of the 41 cholera attacks, 15 had already proved fatal.

On more close questioning, it appeared that the medical officer had not any assistant; that he, therefore, had to dispense medicines as well as visit; that in the midst of such an overwhelming and destructive epidemic, he had not been allowed any extra medical aid; and that in the three preceding weeks he had not had more than one night's undisturbed rest. This gentleman avowed to me confidentially that he was quite exhausted, and unequal to the task of attending to such a multitude of cases, though previously, when in the presence of one or two of the guardians, he attempted to show he could single-handed manage his district. This statement, almost incredible as it may appear, is, however, taken literally from written evidence signed by the officer in question. It will appear even more remarkable, but at the same time most illustrative of the whole system, that, when the appointment of three medical officers was by an order of the General Board directed, the guardians hesitated, and made a formal appeal whether it was necessary, in which step they were supported by their medical officers.

Evils arising from "Orders" being required.—In many instances the guardians required that applicants for medical aid should, as under ordinary circumstances, obtain an "order," either in the first instance, or subsequently, as the condition for the continued supply of advice and medicine. The assistance afforded was thus stamped with the character of pauper relief; a circumstance which in itself, as will be at once apparent to all who are acquainted with the independent poor, would deter multitudes from making application; and which unquestionably contributed powerfully to that fatal delay to which thousands of lives were sacrificed.

Erroneous Principle regulating extra Medical Appointments of the Guardians.—Having given these illustrative details of the principle adopted by the local authorities for affording relief in cholera, it is essential to explain the nature of the appointments when in any union or parish extra medical aid was provided. The same fundamental error that prevailed with respect to the ordinary applied to the extra medical officers: they were appointed upon the principle that they should wait till applied for by the sick poor before giving their services; and, acting according to this idea, the guardians (I do not here speak of the assistants granted to the ordinary surgeons) almost invariably selected gentlemen in private practice, who were expected to give up a portion of their time to these new duties. It formed no part of the agreement that the practitioners thus chosen should institute a house-to-house visitation; and on inquiry I ascertained that nothing of the kind was attempted beyond the ordinary inquiries made by the surgeon when going his round, or when called to see patients in affected localities. In several instances the guardians, with the best intentions and at a very considerable outlay, engaged a large staff. In the parish of St. Mary, Newington, for example, no fewer than nine surgeons, all gentlemen in private practice, were appointed so far back as November, 1848; and they continued in office, with some exceptions, throughout the epidemic. In Lambeth, again, in addition to many assistants

allowed to the ordinary surgeons, it was stated on August 11th that six extra medical officers, private practitioners, had been appointed; on this day the total staff for Lambeth, exclusive of one surgeon at Norwood, was as follows:—

Ordinary surgeons, including the surgeon of the workhouse	8
Assistants to ditto	13
Extra medical officers	6
	<hr/>
Total	27

In the City of London Union a considerable number of private practitioners were also engaged to attend on cholera cases.

The evils of this mode of procedure are shown in the following instance, in which, however, the local authorities deliberately neglected the order of the General Board for a plan of their own. The West London Union, including the parishes of St. Bride, St. Dunstan, Bride-well Precinct, &c., and through which runs Fleet Ditch, suffered most severely; and in consequence of my Report, the General Board issued a special order, dated July 17th, for the appointment of six extra medical officers to institute a systematic house-to-house visitation: these visitors, according to the plan I had arranged, were to have acted under the direction of the ordinary medical officers. Instead of complying with this order, the guardians appointed, on July 24th, three gentlemen in practice, Mr. Ross, Mr. Munday, and Mr. Kelly, who were paid each one guinea a day: some other medical men were subsequently appointed. In the letter of instructions sent by the clerk of the guardians to the three extra surgeons a wish is expressed that a daily household visitation should take place; but on Mr. Ross making, on his own behalf and that of his colleagues, Mr. Munday and Mr. Kelly, an application to the chairman and clerk to know whether it was a part of their duty to make a house-to-house visitation, he was informed that such visitation was not included in their duties; and consequently none was made. On the date when I took this evidence, August 7th, Mr. Ross stated he “had seen thirteen cases of cholera since his appointment (fourteen days), all of them either in collapse or approaching it: some of these cases had had diarrhœa previously, but had not applied; all cases of bowel complaint, if seen early, have yielded to treatment.” Mr. Kelly stated, “Has had three cases of cholera, all fatal; they were first seen in a stage approaching collapse; each of them had had diarrhœa for two or three days that had not been attended to.” Mr. Munday stated he had seen fourteen cases of developed cholera, “all of which, when the patients were first seen, were in a state of collapse, the people having neglected to apply; in all these cases he was applied to to visit the patients: has lost no case from diarrhœa.” The ordinary medical officers, on their part, made no regular house visitation, “not having been called upon by the guardians.” One of these gentlemen adds, “Has had some cases of cholera since the above appointment (that of the extra officers): all these cases were seen first in the state of collapse; believes all of them had had premonitory diarrhœa.” Thus in this union, comprising in the neighbourhood of Fleet-street, Ludgate-hill, &c., some of the most severely visited parts of London, although 21 guineas a week were paid by the

guardians, no efficient preventive measures were put into operation. If, on the contrary, the order of the General Board had been adopted at the time in question, the parishioners would have had the entire services of six medical visitors, who would have gone into the affected localities, house by house, and at an expense of 24 guineas per week.*

After carefully investigating the two systems, that of engaging gentlemen in practice and that of medical visitors, I feel myself justified in stating my conviction, that not only is the latter infinitely more effectual in securing the great object of all these efforts, the diminution of mortality and the consequent saving of life, but that it is also much more economical. The remuneration to the surgeons appointed by the guardians varied so much in different parishes that no very accurate estimate of the expense can be made; but when it is recollected that private practitioners could give up only a portion of their time, and that consequently a larger number was required if anything effectual was to be accomplished, whilst the medical visitors, who were ordinarily paid four guineas a week, devoted their whole time to the discharge of their duties, it may fairly be assumed that, even on the grounds of economy alone, it would have been wise to have accepted a plan the efficacy of which had been tested by an ample experience.

In several populous parishes and unions, and that, too, in districts where, from the dreadful ravages of the disease, the public safety demanded that all parties should have zealously and harmoniously co-operated together, another error was committed by the guardians in making their appointments: they omitted, in a matter so immediately connected with their department, to consult the medical officers; the necessary and direct consequence of which false step was, that the arrangements, not being based on sufficient knowledge, were usually most defective, so that when it was attempted to put them into operation the utmost confusion arose. To such an extent did this pernicious principle extend, that no definite plan of procedure was agreed upon: sometimes, for example, the newly-appointed medical officers, supposing they were only to attend cases of developed cholera, declined to give advice and medicines for premonitory diarrhœa, referring the applicants to the ordinary surgeons, already greatly overtaxed with a multitude of patients; and thus the poor often experienced considerable trouble in obtaining assistance; in other instances, where the object was to establish systematic house visitation, the ordinary and the extra officers not having been assembled to discuss with the guardians their respective duties, no effective operations could be carried out.

But by far the most mischievous result of the entire want of confidence, so often evinced by the local authorities towards their legally appointed medical officers, was the deep dissatisfaction generated in the minds of the latter—a feeling which, although it did not induce any abatement of zeal, reacted most prejudicially in various ways, especially when, in consequence of the interposition of the Board of Health, the medical officers could no longer be excluded from their legitimate influence.

* See a letter on this union from the Rev. Charles Marshall, vicar of St. Bride's, in the Appendix, No. 6.

I cannot quit this subject without a passing allusion to a matter personal to myself. In the discharge of the duties intrusted to me by the General Board, it frequently happened that I was placed in the painful position, as regarded my professional brethren, of objecting to appointments already made by the local authorities ; and in some few instances, but in almost all on the part of guardians, who either were much displeased to have their own arrangements disturbed or their personal friends displaced, it was asserted that, by thus acting, I impugned the qualifications of the gentlemen whom I found in office.

I am desirous, therefore, of publicly stating, what at the time I invariably and fully explained, that in urging the appointment of medical visitors I in no single instance questioned the professional acquirements of the gentlemen already engaged, or indicated by any, the slightest expression, a suspicion that they were not fully competent to discharge the arduous duties they had undertaken.

I would also avail myself of this opportunity to record the unqualified admiration with which I have been inspired, by the unexampled exertions made by the medical officers of the metropolis during the late visitation. With a courage only equalled by their patience these gentlemen rendered at all hours, night and day, inestimable services to the victims of the epidemic ; at a time when all who were able quitted even the healthiest parts of London, the medical officers, often debilitated by their incessant labours, and even suffering under unmistakable symptoms of the disease, never quitted their post, though that was of necessity in the very focus of the pestilence. Many among their number were, after the exhausting fatigues of the day, disturbed in their rest at night for weeks and weeks together : one surgeon did not change his clothes for eight or nine days, sleeping at intervals on a sofa ; another for 18 days had not two hours' consecutive sleep ; and all these great services it should be recollected were, for the most part, performed amidst the obscurity of dark alleys and pestilential dwellings, unseen by the public eye, frequently undervalued even where known, and always miserably underpaid. Examples are not wanting of surgeons who, after a year of such labours and such services, have received for their recompence actually less than would defray the additional outlay caused by the large amount of expensive medicines, and by the provision of an extra assistant. In other instances no extra remuneration whatever was granted. The following statement is extracted from an official communication addressed to the General Board of Health by Mr. Bayfield and Mr. Leadam, the out-door medical officers of St. Olave's union. Mr. Leadam states that "at the commencement of the epidemic, an order was issued directing the medical officers to attend all cases of cholera and diarrhœa immediately, without waiting for the usual legal order ; and handbills were published to convey this information to the poor at large." The consequence was, that in a district "teeming with cholera" these medical officers "were day and night assailed by applications for medical relief ;" they attended and prescribed for 219 cases of developed cholera, and 2927 cases of choleraic diarrhœa ; they applied to the guardians for remuneration, and received in reply the following resolution :—"That the application of the out-door medical officers for remuneration for their extra services during

the prevalence of the epidemic be not entertained." These gentlemen then applied to the Poor Law Board, and were informed that the Board were unable to interfere further in their behalf. They next applied to the General Board of Health, and received a reply, from which the following is an extract:—"I am to state in reply that the Board regret very much the decision of the Board of Guardians, being fully of opinion that those services were exceedingly laborious and of vast consequence; but the General Board have no power to oblige the Board of Guardians to make any allowance for those unusual duties." In one wealthy parish, where one of the surgeons had attended 42 cases of cholera and had supplied medicine in 620 cases of diarrhœa, the medical officers, on remonstrating, were told by the guardians that their baker or butcher might as well expect on the same ground an allowance whenever provisions rose in price. I have conceived it to be my duty to state these facts, first of all, because there is no one who has had a more favourable opportunity than myself of witnessing the meritorious conduct here feebly indicated; and secondly, because it is to be apprehended that in the event of a second visitation the interests of the poor might suffer; since, whatever may have been the amount of self-sacrifice evinced by the members of the profession during the late epidemic, it would be contrary to all experience to expect again such devotion from a body of men, who know and feel that their sacrifices to the public weal have gone almost unnoticed, and certainly, as a rule, unrewarded.

Want of Hospital Accommodation, Nurses, and Houses of Refuge.—Having said so much of the defective parochial arrangements respecting medical service, I can only briefly state that other and most serious omissions occurred during the late epidemic. In various quarters there was a great want of hospital accommodation, and I received repeated complaints from the medical officers that they were unable to remove patients lying in miserable, filthy, and overcrowded rooms, where any chance of recovery was destroyed by the total absence of all the appliances demanded in the advanced stage of the epidemic. In several parishes some provision was made for the reception of such cases; but for the most part it was altogether unequal to the requirements of the medical attendants. In speaking on this point I am aware that great difficulties were experienced by the guardians when attempts were made to procure suitable accommodation, the owners of property naturally enough objecting to let their premises for such a purpose. In Lambeth, for instance, I know that repeated efforts of the kind were made by the authorities, but unavailingly; in other cases, on the contrary, I feel assured that by proper exertions this important desideratum might have been secured.

There was during the prevalence of cholera another serious defect, which, there can be no doubt, might, by ordinary care, have been entirely obviated; I allude to the great want of nurses, both as regarded number and qualification. On this point I received repeated complaints from the medical officers; and yet, considering the absence of hospital accommodation, which prevented the removal of the sick when desirable, and the want of all the articles required to minister relief to the sufferers in the miserable dwellings of the poor, nothing would have con-

duced so much to second the efforts of the medical attendants as a staff of respectable and trustworthy nurses provided with the necessary requirements. In most parishes some few nurses, it is true, were supplied; but they were usually insufficient in number, and, being for the most part paupers, were often not qualified for their office.

It is one of the best established facts that in the management of cholera there is not, next to prompt medical aid, any measure susceptible of immediate application so effectual as the removal of those who are yet well, but threatened with the pestilence, out of the crowded and miserable abodes usually selected for attacks of the epidemic. There was therefore no provision more urgently demanded for controlling the force of the epidemic than *houses of refuge*; and yet I do not recall more than two or three instances in which any such places were opened by the authorities. I am again not unmindful of the difficulties which were met with in this respect, for there is no doubt that the objections which applied to the letting of premises for cholera hospitals, also operated, though in a much less degree, as regarded a house of refuge. The testimony of the medical officers was uniform as to the enormous evils that resulted from the impossibility they experienced of removing families living in single rooms when one or more of their members were attacked. In every part of the metropolis these instances were constantly recurring; members of the same family were again and again attacked in succession, as many as three, four, five, and six persons, succumbing one after another in the same house; in fact, the mortality tables in many localities were swollen by such catastrophes as these. Now it was the concurrent medical opinion, and it is in perfect keeping with all experience in India and Europe, that if, when a special locality was first seized, it had been possible to have taken out for a short time the inhabitants of the most crowded rooms, till these had been purified and cleansed, the happiest results would have followed. And it must be recollected that one of the marked peculiarities of cholera, namely, that it attacks in *groups*, seizing upon a certain cluster of houses, then ceasing and visiting another such restricted locality perhaps to return again to its first seat, would have particularly favoured this proceeding; since the few days required for the cleansing operations would also have given time for the force of the epidemic in the particular spot to have subsided, so that, when the people returned invigorated by breathing a purer air, they would have had a much better chance of escape; whilst, as group after group of houses was attacked, the same process might have been adopted in succession. As one of the principal impediments was the difficulty of procuring premises, it is obvious, if any other attack of cholera should unhappily occur, that one of the first measures to be adopted would be to erect some temporary buildings in open and central situations, to which families under the circumstances indicated might be temporarily removed.

In terminating this sketch of the system so generally pursued by the local authorities, and on maturely considering the whole subject, I can arrive at no other than the following conclusions:—

1. That the proceedings of the guardians tended, in a great majority of instances, to defeat the benevolent designs of the Legislature for the

improvement of the public health, especially in so far as they involved the neglect of the various and important sanitary precautions, contemplated by the Act of Parliament for guarding the community from destructive epidemic disease.

2. That the system adopted during the prevalence of cholera for affording medical aid to the poor was erroneous in principle; especially as it related to the neglect of the first and curable stage of the epidemic.

3. That sufficient medical and other aid was not afforded.

4. That this course of procedure caused a large sacrifice of human life.

Views of the Medical Officers relative to the Measures required to meet the Epidemic.—In the preceding pages I have borne my humble testimony to the meritorious conduct of the medical officers of the metropolis during the late melancholy visitation; and I have especially pointed out the vast evils which, so far as I have been able to judge, have sprung from that shortsighted policy which deprived the parochial surgeons of those full powers with which, for the common safety, they ought to have been intrusted. But it is my duty, at the same time, to state I have sufficient reason to know that much mischief was caused in several districts by the views maintained by the medical officers themselves respecting the management of the epidemic.

It is matter of such primary importance, with reference to any subsequent attack of cholera, that no fallacy should exist upon this point, that it becomes essential to enter into some detail respecting it. The opinion entertained by many medical officers was to this effect—that as they and their assistants visited repeatedly the infected districts; that as they went through them, for instance, three or even more times daily; that as they made in these visits extensive inquiries among the people as to the existence of bowel complaints, no other plan could be adopted with advantage. This was the reason most commonly assigned for dissenting from the views of the General Board respecting house visitation. It was also frequently contended that ample means had been adopted to advertise the people of the necessity for making early application in all attacks of diarrhoea by handbills and placards; and, in proof of the correctness of this view, it was stated, and truly, that great multitudes of the poor did apply for and receive medicine, and that the surgeries of the medical officers were crowded with applicants day after day. Notwithstanding the confidence with which this opinion was advocated, it is certain, as was indeed made apparent by the evidence of these gentlemen themselves, that it was essentially erroneous. Thus in one parish on the south of the river, which suffered most severely, no less than 112 deaths having been registered in the week ending August 4th, the medical officers on the 8th, after several interviews with me, still contended that a house-to-house visitation was neither necessary nor practicable, although on the same day one of these gentlemen stated he had had a considerable number of cholera cases lately, the majority of which were seen for the first time in collapse; whilst the other had given it in evidence on July 27th that “the poor generally neglect to apply till

the attack becomes severe," that is, till it had by delay become well-nigh hopeless, so far as medical treatment is concerned.

In another parish, where the medical officers had been authorized by the guardians to provide extra medical aid when in their judgment it was required, one assistant had been so appointed; but I found on August 3rd that there was a considerable mortality from cholera (in the week ending August 4th, 15 deaths were registered); that, according to the medical officers' own evidence, the epidemic "had decidedly increased in the parish, and had spread to new localities;" that no systematic house visitation had taken place; and yet it was affirmed that "no further medical aid was required." This opinion was the more remarkable, since the evidence of the new assistant showed that his imperfect visits had been productive of the most important benefits. This gentleman stated that "the bowel complaints, if seen early, were in the great majority of cases curable. Had not had a single case of diarrhœa which, when he saw the patient early, went on into cholera."

Many instances of a similar nature came to my knowledge, but the two now adduced may suffice to show the serious difficulties which were opposed to the introduction of the only efficient method of dealing with a pestilence which was at the time striking down thousands of victims. In those districts where these views prevailed, it is my duty to point out that the evils extended beyond what concerned the precious time already lost; for, backed by such opinions, it was not a matter of surprise that, when an imperative order was sent by the General Board to the guardians to institute house-visitation, delays and even pertinacious opposition were interposed: in the former of the above instances the guardians, in fact, did not yield till legal proceedings were adopted.

*Reports on the Metropolitan Workhouses.**—Before concluding this section, it is proper, as connected with the subjects considered in the preceding pages, to call attention to the fact, that, in December, 1847, a special inquiry was, at the instance of Sir George Grey, instituted by the Poor Law Board, for the purpose of ascertaining what special arrangements might be necessary, in the metropolitan workhouses, for the reception and relief of destitute persons attacked with cholera. The inspectors appointed for this purpose—Dr. Arthur Farre, Mr. Martin, and Mr. Toynbee—in their Report, dated January 19th, 1848, state that—

"As it appears that in a large number of the workhouses no fitting reception can be afforded for the destitute and those deserted through groundless fear

* 1. Report on the Capabilities of the Metropolitan Workhouses for the Reception and Treatment of Cholera Cases. Presented to both Houses of Parliament by command of Her Majesty, 1848.

† 2. Report of Dr. Arthur Farre and Mr. Grainger to the General Board of Health on Thirty-eight Metropolitan Workhouses, dated March 1848. Ordered by the House of Commons to be printed, March 1850.

of contagion, it becomes necessary that some other provision (out of the house) should be either immediately made, or at least kept in view, in every such instance." *

The inspectors point out, farther, the necessity of properly qualified nurses being provided; judiciously observing that, as cholera runs its course most rapidly,

"the loss of an hour may compromise life; and throughout the disease the most careful and attentive nursing of the sick is of the utmost importance to the cure; many lives are lost in cholera through the mere endeavour of the patient to sit or stand erect, so exhausted are the powers of life in the latter stages of this disease."

Very full and precise recommendations are also given, both in respect to each individual workhouse and generally, for effecting sanitary improvements, and for maintaining the health of the inmates, under the well-grounded apprehension of a visitation of cholera.

In the month of January, 1849, the General Board of Health instructed Dr. A. Farre and myself to visit the metropolitan workhouses for the purpose of ascertaining (1) the general state of their inmates, especially in reference to the existence of cholera and diarrhœa; (2) the general arrangements of these establishments in regard to sanitary measures and precautions; and (3) the extent to which the recommendations contained in the Report of 1848, above noticed, had been observed or neglected. At the period when this inquiry took place, cholera had been existing in London some months; several severe outbreaks had occurred, and many hundred deaths had taken place. But, notwithstanding this, it will appear by the following extracts from Dr. Farre's and my Report that the various measures recommended a year before had been very imperfectly realised:—

"The third point of inquiry upon which we have to report relates to the extent to which the recommendations of the inspectors appointed, at the desire of Sir George Grey, to examine and report on workhouses, have been regarded or neglected. Upon this particular, we find, that, with a few exceptions, which we shall here notice, these recommendations have either not been attended to, or have only recently been brought under consideration, and are so partially carried out as to extend to one or two particulars only, whilst others, and often the principal ones, have been neglected. But in no instance, with the solitary exception to be mentioned, does it appear that the authorities have originated those improvements which the apprehension of an epidemic invasion would have justified, and which the recommendations of the Report, whilst they were intended to be suggestive in matters of detail, were also calculated to put forward for general consideration."

After enumerating those workhouses in which improvements had been more or less completely effected, it is stated that in the remaining houses,

"either the improvements are so slight as not to justify any mention of them here, or else in every other instance no change whatever has taken place; so that for these, the Report of 1848 appears to have remained a dead letter."†

* *L. c.*, p. 45.

† Report on Metropolitan Workhouses, p. 28.

The subjects most generally neglected, as regarded the interior of the workhouses, were those most important with respect to the maintenance of health—namely, ventilation and defective arrangements as to privies and waterclosets: this is the more to be regretted, since inexpensive and efficient modes of improvement were fully described in the Report of 1848. With respect to the want of hospital accommodation, although, as stated in a preceding page, serious difficulties did exist in obtaining suitable premises, these might have been overcome in most instances by timely and zealous exertions. It is much to be regretted that properly qualified nurses were not, as recommended by the inspectors, provided on the very first appearance of the epidemic.

SECTION IX.

Measures adopted by the General Board of Health, and on the System of House Visitation.

It has been shown in the preceding section that the measures prescribed by the Board of Health for mitigating, as far as that might be possible in the present sanitary state of the metropolis, the ravages of cholera, were of a most comprehensive character; due provision being made, on the one hand, for the removal of all causes known to be prejudicial to the public health; and on the other, for securing to the poor all the appliances of medical science for the relief of persons actually suffering from the pestilence (see Appendix, No. 7).

After the statements contained in the previous part of this Report, it need only be remarked in this place, that up till the last moment in which the preventive measures were left to the Boards of Guardians most serious errors were committed, of which no more striking confirmation can be adduced than that afforded by the City of London Unions; in which, with the exception of the East London Union, where my recommendation for the appointment of medical visitors was promptly carried into effect, the arrangements were so unsatisfactory as to lead to the interposition of the Lord Mayor and the City Committee of Health, to whom, on September 13th, 1849, I had the honour of submitting a plan for meeting the epidemic in the City, in which was included systematic house-visitation, the admirable operation of which in controlling the ravages of the disease had already been amply proved in other districts of the metropolis. Visitors were appointed, and, in combination with the highly efficient ordinary medical staff, and under the able superintendence of the distinguished officer of Health for the City of London, Mr. Simon, the most happy results were obtained.

On the System of House-to-house Medical Visitation.

The Metropolitan Sanitary Commission, to which body the members of the Board of Health were attached, had prior to the arrival of cholera in this country collected some most important evidence, showing the great success that had attended the early treatment of the premonitory diarrhoea at Bilston, in 1832, under the direction of the late Dr. M'Cann, an individual to whose memory the public gratitude is due

for having established the great and only successful method for the management of this destructive epidemic. The evidence of that distinguished surgeon Mr. Hodgson, formerly of Birmingham, is particularly instructive in connexion with this point, and well worthy the attention of all medical practitioners (see Appendix No. 8).

The main feature of Dr. M'Cann's plan, as to the executive part, was the opening of a dispensary for giving early assistance to persons labouring under bowel complaints; a measure always of great importance, and which at Bilston had a most marked and immediate influence in putting a stop to the ravages of cholera. It does not appear that any system of house visitation, the only complete plan of procedure, was established; the merit of devising which, as well as of fully realising the great principle of seeking out and promptly treating the epidemic in its first stage, is due to the General Board of Health. It is right to state that when, in October, 1848, the whole procedure was by the General Board reduced to a system, nothing of the kind had been attempted in Europe. On visiting Berlin and Hamburg, I found no method adopted for the seeking out of the epidemic in its first stage; all the arrangements of the authorities were directed not to preventive treatment, but to the provision of medical aid when it was sought for by the people. It is also remarkable, considering the great success that had attended the management of the disease by Dr. M'Cann's method, that even in this country no efforts commensurate with the supreme importance of early treatment were made to secure it; so far from this being the case, there was, in the highest ranks of the medical profession in the commencement of the epidemic, considerable scepticism as to the value of preventive treatment in the diarrhœal stage; a great change has, however, in this respect, been since effected by the marked success which has resulted from the measures put into execution under the auspices of the Board of Health.*

Commencement of the House Visitation.—It was the earnest desire of the General Board of Health, that from the very commencement of the epidemic in 1848, the system of house visitation should be vigorously put into operation throughout the country. In Scotland, as it will appear in the Report of my colleague Dr. Sutherland, the instructions of the General Board were promptly and zealously adopted by the local authorities, and with the happiest results.

Effectually to have applied the system to London, the various districts of the metropolis ought to have been regarded as so many smaller towns, and in each of these a complete machinery should have been provided—a medical superintendent, medical visitors, nurses, dispensaries open day and night, houses of refuge, and a limited number of hospitals judiciously placed in different parts of the metropolis. But nothing of this efficient character was attempted notwithstanding repeated and urgent representations. During the first eleven months,

* I have now before me a letter from a distinguished physiologist, and a physician in large practice: he says, "At the commencement of the epidemic I regarded the house-to-house visitation system as superfluous;" his opinion, however, was so entirely changed by observing the success of that measure, that he thus expresses himself with reference to any future epidemic:—"I think that it is the urgent duty of parishes to provide, at the moment of an outbreak of cholera, an efficient staff of house-to-house visitors to ferret out all cases of diarrhœa."

whilst the epidemic was prevailing in the metropolis, the superintendence of preventive measures was committed to my care; and in the midst of incessant demands made on my time, which was also frequently occupied by visits to other towns where the epidemic prevailed, it was impossible, in most instances, for me to do more than to ascertain the state of the disease, and to advise what measures were required, the execution of these remaining with the local authorities. When at length, in the last week of August, 1849, and when the weekly mortality from cholera had mounted to upwards of 1200, the system was put into execution, this was only most partially effected; several unions and parishes, and among them some of the most populous, refusing to conform with the directions of the General Board; whilst in others delays occurred in the appointment of the requisite number of medical visitors. The consequence of all this was, that in some large districts of the metropolis the system was never applied at all; and even in those parishes where it was adopted, there was not one in which it could be said the visitation was thoroughly carried out. It is essentially requisite to place these facts on record, or otherwise it might be inferred that the results about to be stated, which were in reality derived from a very limited application of this great preventive measure, were the product of its universal operation throughout the whole of the metropolis.

On August 24th, 1849, the General Board having for the first time been enabled to engage the services of a sufficient number of medical men to superintend the system of house visitation in the metropolis, the following gentlemen were selected for this duty:—Dr. Gavin, Dr. Macloughlin, Dr. Waller Lewis, Dr. King, Mr. Liddle, Mr. Walsh, Mr. Falconer, and Mr. Patterson.

The number of the superintending inspectors was reduced as the epidemic declined; the services of Dr. Gavin, to whom several of the most important districts were assigned, being discontinued on October 27th.

The medical visitors were appointed and paid by the unions and parishes, their number being determined, on the reports of the inspectors, by the General Board. With some few exceptions these gentlemen were legally qualified; a few senior students were selected where difficulty was experienced in procuring members of the College of Surgeons or Society of Apothecaries. On the whole, fewer difficulties than were anticipated occurred from a want of properly qualified practitioners, every facility being afforded in this respect by the Board of Health. The ordinary payment was 4*l.* 4*s.* a week, and for this remuneration it was required that those engaged should give up their whole time, the period devoted daily to actual visitation being usually about eight hours. In some instances more liberal remuneration was granted; and in the case of provincial towns all travelling expenses were defrayed. In all circumstances medicine was provided by the local authorities.

Although some of the inspectors were appointed on August 25th, little progress was made in actual visitation till the first week in September, owing to the time occupied in preliminary inquiries and arrangements. The last report was published on October 27th, the whole period thus occupying about eight weeks.

Unions and Parishes in which House Visitation was adopted.—The preventive treatment under the direction of the General Board of Health was more or less carried into operation in the following unions and parishes, in some instances only for a few days:—

- | | |
|---|----------------------------|
| 1. Kensington. | 14. Bethnal Green. |
| 2. Chelsea. | 15. Whitechapel. |
| 3. St. George, Hanover-square. | 16. Stepney. |
| 4. Westminster (St. Margaret's and St. John's). | 17. Poplar. |
| 5. St. Martin in the Fields. | 18. St. Saviour. |
| 6. Islington. | 19. St. Olave. |
| 7. Hackney. | 20. Bermondsey. |
| 8. St. Giles. | 21. St. George, Southwark. |
| 9. Strand Union. | 22. Newington. |
| 10. Holborn. | 23. Lambeth. |
| 11. Clerkenwell. | 24. Wandsworth. |
| 12. St. Luke. | 25. Camberwell. |
| 13. Shoreditch. | 26. Greenwich. |

The system of the General Board was not adopted in the following parishes:—

- | | |
|----------------------------|----------------------------|
| 1. St. James, Westminster. | 5. St. George in the East. |
| 2. Marylebone. | 6. Rotherhithe. |
| 3. Hampstead.* | 7. Paddington.† |
| 4. St. Pancras. | |

Duties of the Inspectors.—In order to guide the medical inspectors appointed for this special service in the discharge of their duties, full instructions were printed by the General Board, of which a copy will be found in the Appendix. The duties of the medical visitors were likewise explained in the same document (see Appendix, No. 9). In making the preliminary arrangements I had the great advantage of the experience of my friend Dr. Sutherland, under whose efficient and judicious superintendence the system had been so extensively carried out in Scotland. The principal duties of an inspector were as follows:—

1. To ascertain, by daily reference to the returns of the Registrar of Deaths, by the returns of the district medical officers and visitors, and by any other available sources, the precise localities most affected by cholera in his district.

2. To make out daily lists of such streets and houses as are specially affected, and on these data to locate his visitors for their daily work.

3. To visit personally the infected localities, to see that the visitation is properly carried out, to ascertain the accuracy of the returns, and to see that no cases have been overlooked.

4. To receive reports from the visitors of all nuisances and circumstances injurious to health; to communicate these to the local authorities, and especially to the Inspector of Nuisances; and to take care as far as possible that they are removed, and in case of neglect to report the same to the Board of Health.

5. To make a daily report to the General Board on the exact state of the epidemic, on any measures required, as to increase of visitors,

* In this district the disease was extremely mild, 9 deaths only having occurred from October 7, 1848, to November 24, 1849.

† The epidemic was in this parish trifling.

provision of nurses, inspectors of nuisances, &c. ; and to give a general view of the state of his district.

6. To ascertain if there are any manufactories, works, or other places where numbers of workpeople are employed ; and, if so, whether proper provision has been made to provide prompt treatment on the spot of all cases of diarrhœa ; or otherwise to report to the Board of Health what measures may be necessary.

In order further to facilitate the whole of the proceedings, and to enable the General Board to receive the earliest information of the exact progress of the disease, the inspectors met me daily, when full reports were made, and the various measures required were reported and immediately ordered. In this way it was impossible, where an efficient staff of visitors was provided by the authorities, for the epidemic to attain any development in a new district ; since on the first intimation of an outbreak the full force of the visitors was immediately applied ; and in this way in several marked instances the disease was kept down.

Duties of Medical Visitors.—The medical visitors, although appointed and paid by the local authorities, were placed under the entire direction of the inspectors, an arrangement indispensable to all prompt and sustained measures. Each parish or union, as the case might be, was divided into sub-districts, to each of which a visitor, whose duties were as follows, was allotted :—

1. To visit every house, and every family in it, once each day at least ; and, in cases of sudden attacks of the epidemic in confined localities, or whenever the disease is more than usually severe, more frequently, according to the emergency.

2. To be provided with proper medicines to administer on the spot to all persons suffering from premonitory symptoms or cholera ; to take charge of all diarrhœal cases till cured ; to hand over all cases of confirmed cholera which are discovered, after administering to them, to the care of the ordinary medical officer of the district, or of the surgeon expressly appointed for that purpose.

3. To allay alarm among the people by explaining to them that cholera is not usually a sudden and destructive disease, but that it begins by a milder stage consisting of diarrhœa, which is almost invariably curable ; to warn them of the danger of delay, and the safety to be attained by early medical aid ; to urge them, if seized with indisposition in the intervals between their visits, to apply to the surgeries of the medical officers, or to dispensaries, if provided, at any hour, night or day ; and especially to warn them not to wait if taken ill till the visitor comes round.

4. To inquire into and report on all nuisances, accumulations of filth, overflowing cesspools, houses requiring cleansing, &c. ; to advise the people on the importance of cleanliness, ventilation, temperance, &c.

5. To take notes of the particulars specified in the "Visitors' Return" (see Appendix, No. 10), and from these to make a return daily to the medical inspector.

Duties of Lay Visitors.—In some parishes lay visitors were appointed, whose duty it was to discover the existence of cholera and diarrhœal cases ; to send either the patient or a friend to the nearest medical officer for assistance ; and to take a note of all cases, in order to ascertain whether the parties have applied. This class was also to

assist the medical visitors by directing them to persons wanting aid ; to give advice to the people ; and generally to facilitate the introduction of preventive measures.

It is proper to premise, before entering into details, that great care was taken to ensure accuracy in the returns of all the inspectors ; each visitor was held responsible for the correctness of his daily report ; the inspectors frequently went through the districts to check the returns, and the result of treatment, by inquiries among the people. It is especially due to Dr. Gavin, to whose charge, at one or other time of the visitation, all the principal unions and parishes were intrusted, and whose returns include more than half of all the diarrhœal cases reported to the Board of Health (namely, 25,403), to explain that, to insure efficiency and accuracy, he met the visitors under his direction every night ; and, as those gentlemen brought their returns with them, and related every circumstance that had occurred during the day, all sources of error were completely obviated. In the course of the house visitation I repeatedly urged on the inspectors the importance of accuracy. It is probable that, among so large a number of cases and details, some errors unavoidably arose, but I have no knowledge of such an occurrence. After again reviewing these proceedings I feel full confidence that the results stated closely approximate to the truth ; but in regard to the number of cases of diarrhœa which are reported to have passed into cholera, even if these were double those reported, they would not amount to much more than one in 500, a result which must be hailed as a great boon conferred on humanity. It is not unimportant to observe, further, that the experience of many medical officers coincides to a great extent with the extraordinary success attending the prompt treatment of choleraic diarrhœa, allowance being made for the very influential circumstance that, as in the house visitation the cases were sought out, they were brought under treatment at an earlier stage, and consequently at a period when, as all observation shows, the affection, regarded as an epidemic, is most manageable.

Many instances of a similar character might likewise be adduced from the private practice of gentlemen in London, as well as from the experience of various public institutions ; but space will only allow me to mention that of the Eastern and Tower Hamlets Dispensaries, for the interesting details of which I am indebted to my friend Dr. Munk, to whom great credit is due for the introduction and execution of a plan productive of such happy results. When the disease began rapidly to extend, on the suggestion of Dr. Munk the committees of these two institutions unanimously agreed to render them available as diarrhœa dispensaries, open at all hours for the supply of medicine to all comers, the use of recommendatory letters being suspended. At the Eastern Dispensary, 819 persons in the last year were thus treated for the premonitory symptoms of cholera, not one of whom, so far as Dr. Munk could ascertain, after very numerous and express inquiries, passed into collapse. At the Tower Hamlets Dispensary, 250 persons, of whom five subsequently died from the disease, were treated. The history of these five cases is important :—

“In all these instances,” says Dr. Munk, “the disease was very far advanced when the medicine was applied for ; and in two of them the

patients were brought from the street into the dispensary, with the fully-formed disease upon them."

This gentleman states, as the result of his experience, "that the premonitory stages of the malady are easily controlled by treatment; and that, under proper and early care, but very few cases run on to a fatal termination:" adding, that "the large majority of the cases above referred to were of a peculiar and specific character, and that they were essentially dependent on the same general cause which gave rise to cholera itself."

It thus, then, appears that, great as was the success of the preventive system of the Board of Health, it is, after all, in keeping with general experience; the marked efficiency of the procedure consisting not so much in anything novel, as in securing that which is by no other means attainable, and yet is the great desideratum aimed at by all practitioners—the discovery and prompt treatment of the disease, at the moment when it first declares itself by relaxation of the bowels, or active purging.

Period of Epidemic when Visitation was commenced.—In considering the system of house-visitation, it is, however, essential to note the period of the epidemic when it was first put into action; or otherwise the results obtained might be attributed rather to the natural course of the disease, than to the efficacy of the measure itself. Little was done till the first week of September, and at that time the cholera was approaching its acme, the deaths being as follows:—

Week ending August 25th	1272
" September 1st	1663
" September 8th	2026
" September 15th	1682
" September 22nd	839
" September 28th	434

It cannot be affirmed, then, that the uniform success which attended the preventive treatment in all parts of London was due to the decline of the epidemic; so far was this from being the case, the disease, at the precise moment, was in several of the districts visited raging in a most violent and alarming manner. It would obviously lead to useless details to enter into an account of the house-visitation in each locality where it was carried into effect; a statement of the general results, and a selection from two or three individual parishes, will suffice to exhibit the working of the system, and the benefits which followed its adoption.

General Results.—The tabulated returns made daily to the Board of Health, so far as the house-visitation was concerned, included the following particulars:—

1. The number of cases of diarrhœa discovered and treated in the preceding 24 hours by the visitors.
2. The number of cases similarly discovered approaching cholera, or those more particularly in which there was "rice-water purging."
3. The number of cases of cholera discovered by the medical visitors in their rounds, which had not received any previous medical aid.
4. The number of corpses discovered by the visitors, of persons who had received no medical assistance.
5. The number of cases of diarrhœa and rice-water purging which passed into developed cholera after treatment by the visitors.

In reference to these returns, it is proper to explain that under the

head of "diarrhoea" were included a large number of cases in which other symptoms, indicative of the severity of the attack, such as depression of the system, spasms, and especially vomiting, were super-added; and in a large number of these attacks the evacuations, although not of the characteristic "rice-water" nature, were thin and light-coloured, showing the choleraic type.

The general result of the house-visitation is shown in the following return, which was the last issued by the General Board of Health, and which includes the period from September 1st to October 27th, 1849:—

Cases of Diarrhoea discovered.	Cases approaching Cholera discovered.	Cases of Cholera discovered.	Corpses discovered.	Cases which passed into Cholera after Treatment.
43,737	978	780	17	52

Owing to the incessant occupation of the inspectors in their several districts, the reports for some days were not given in regularly, although the totals were recorded, so that the ultimate results were not affected. The following table, showing the daily progress of the house-visitation for one month, will exhibit the general working of the system. The number of parishes and unions visited varied in this period, the highest number in one day being 21, and the lowest, towards the conclusion of the system, 5; the average number for the month was $19\frac{1}{3}$.

	Diarrhoea.	Rice-water Purging.	Cholera.	Passed into Cholera after Treatment.
September 21, 1849 . .	835	21	13	3
„ 22, „ . .	942	12	10	0
„ 24, „ two days	1,685	25	8	0
„ 25, „ . .	1,186	19	7	1
„ 26, „ . .	982	10	15	1
„ 27, „ . .	1,071	10	9	2
„ 28, „ . .	992	16	7	1
„ 29, „ . .	1,135	12	2	0
October 1, „ two days	1,877	20	5	0
„ 2, „ . .	1,633	17	11	0
„ 3, „ . .	1,379	22	6	0
„ 4, „ . .	1,010	11	8	1
„ 5, „ . .	1,119	11	8	0
„ 6, „ . .	986	10	5	0
„ 8, „ two days	1,751	15	12	0
„ 9, „ . .	901	5	1	0
„ 10, „ . .	1,135	14	1	0
„ 11, „ . .	839	2	3	0
„ 12, „ . .	794	2	3	0
„ 13, „ . .	657	1	1	0
„ 15, „ two days	1,191	9	1	0
„ 16, „ . .	527	2	0	1
„ 17, „ . .	605	5	1	1
„ 19, „ two days	1,155	6	0	0
„ 20, „ . .	416	5	0	0
Total	26,803	282	137	11

For the purpose of illustrating the system in a detailed manner, two or three instances may be selected where the visitation was, comparatively, most effectively carried out.

BETHNAL-GREEN.—On August 20th, 1849, Dr. Gavin was appointed Medical Inspector,* and was instructed to take superintendence of the parishes of Bethnal-green and Shoreditch, and in a few days subsequently of Hackney. Prior to this appointment the epidemic had attained a great force in Bethnal-green, the deaths in the weeks ending on August 11th, 18th, and 25th, having been 35, 125, 127 respectively: the virulence of the disease was so great, that in four days (August 12th to 15th) no fewer than 92 deaths from cholera and 3 from diarrhœa are reported.

“This sudden and violent outbreak took place in the night; consternation and alarm spread abroad, and the streets were filled with anxious relatives. Mr. Murray, the registrar of the Hackney-road district, states in his returns, that ‘the 12th, 13th, and 14th of this month will long be remembered in this neighbourhood, the outbreak of this fatal disease being without any adequate preparation—surgeons wanted in many places at once: the hurried passing and repassing of messengers, and the wailing of the relatives filled the streets with confusion and woe, and impressed us all with a deep sense of an awful calamity.’”

In the previous week’s return the Registrar remarks, “Medical men are called in when the people are dying, but it is then too late.” Up to this time no house-visitation had been attempted, and the medical staff, as to numbers, was totally insufficient to grapple with so fearful a pestilence.

Under such circumstances, it was natural that Dr. Gavin should enter, on August 24th, on the discharge of his important duties “with a full consciousness of the great responsibility placed on him.” Having a thorough knowledge of the whole district, he lost not a moment in preferring a Report on the exact state of the epidemic, and the measures demanded to meet it. On the 25th this Report was laid before the General Board of Health, who immediately issued a special order to the following effect:—

1. That four medical visitors be appointed, and to devote their whole time to house-visitation of the affected districts.
2. That an additional, properly qualified, medical officer be immediately appointed to aid in treating cholera cases in the infirmary.
3. That an adequate number of careful and efficient nurses be secured to take charge of persons attacked.
4. That immediate steps be adopted for providing, as speedily as possible, suitable hospital accommodation, as near as may be practicable to the several infected districts, with proper medical officers and nurses.
5. That handbills, giving full information of these arrangements, be circulated from house to house, in such parts as the medical officer may think necessary.

Owing to the delay connected with most of the arrangements of the local

* Dr. Gavin commenced his duties a few days before the other inspectors.

authorities, this order was not taken into consideration by the guardians till the 30th of August, when the medical inspector attended, and impressed on the Board the great value and importance of the measures directed. The extra medical officers were sanctioned ; but owing to the difficulty of finding persons willing to undertake the dangerous duties of the constant visitation of localities so fearfully afflicted, and from which there arose an odour so offensive as to be especially nauseous to all not accustomed to breathe so foul an atmosphere, some delay occurred, so that only one visitor was applied on the 31st, on the 2nd of September a second, and two more on the 4th. One of these gentlemen, on commencing his duties, was so overcome with excessive nausea, that he resigned. Dr. Gavin says—

“ On inducting the visitors into their duties, and personally undertaking the first task, I was struck with the peculiar offensiveness of the smells arising from the whole district: an offensiveness everywhere more remarkable than at ordinary times, and which, from my frequent visitation of the district, I was well able to observe could not be due to any peculiar excess of filth, but to some state of the atmosphere which either rendered these emanations from decomposing matters more soluble, or prevented those changes taking place in them which destroyed the offensive compounds, and converted them into others less odorous.”

The inspector states he is not aware that any steps were taken to provide the nurses ordered. Nor was any hospital accommodation provided, although the parish workhouse, being at such a distance that patients would have to be carried, in collapse, often a mile and a quarter to a mile and a half, was unfitted for this purpose. Dr. Gavin gives it as his opinion that “ through this want a large amount of loss of life, with its attendant misery, was entailed on the district.” He adds that he was informed the guardians endeavoured to procure a house of reception for cholera patients, at the same time protesting against its necessity.

The ordinary medical officers were requested to attend all cases of choleraic disease whenever requested, and also to afford advice and medicine at all hours day and night ; but it soon became apparent

“ that four out of five of the medical officers were attempting to cope with the amount of labour entailed upon them single-handed, chiefly because their remuneration was so scanty they could not afford to keep assistants to attend to the dispensaries established at their houses. It was, therefore, ordered by your Board—

“ That duly qualified persons be appointed forthwith to be in attendance at the dispensaries and depôts already established within the parish, in order that persons applying for medical relief may receive the same at all hours of the day and night.”

The order further directed that a staff of men should be kept in readiness, with all proper materials, to carry out all works of lime-washing, &c., in houses wherein cholera had occurred ; and, also, that an additional supply of water be provided for a complete and frequent washing of the courts and other confined localities ; directions, however, which it is reported were most inefficiently carried out.

One very important measure in all cases of this nature is the establishment of dispensaries, open night and day, in the centre of each affected locality. This was especially demanded in Church-street, and the General Board consequently directed one to be opened. This part

of the order was not carried into effect. Upon this serious omission Dr. Gavin reports as follows :—

“The neglect of this provision, doubtless, contributed to the sum of the mortality of the district.

“I regret the want of this most necessary provision the more deeply as it was abundantly proved by evidence given before coroners’ juries, by the visitors, by the medical officer, and by other competent persons, that the disease chiefly manifested itself in the early morning, and therefore at a time when the visitors could not be visiting, and when the medical officer, overcome by excessive fatigue, could not be expected to be in his surgery.”

Two inspectors of nuisances, who were to devote their whole time, were ordered by the General Board to be appointed; as it was evident that the surveyor of pavements and the beadle, already directed by the guardians to discharge the important duties of this office, could not give up the necessary time: one of the inspectors only was appointed.

“The disease chiefly prevailed in that portion of the Hackney-road district which is behind and south of Shoreditch church, and adjoins the Tower district.

“A space of about 400 yards by 150 would include a great part of the district which chiefly furnished the excessive mortality. On the 25th the registrar remarked, ‘From the registration of the last fortnight I find that 99 out of 107 fatal cases of cholera and diarrhœa have occurred in a space occupying less than a tenth of my district.’ There, then, was the proper spot to which to allocate the medical visitors, and to test the practical utility of the preventive measures adopted. The amount of deaths in the week ending 31st August, in the locality referred to, was 48 of cholera and 6 of diarrhœa. In the week succeeding, it was 27 of cholera and 4 of diarrhœa.

“All care has been taken to include every case of the disease which can be discovered to have died elsewhere than in the district, but which could fairly be attributed to the district. *A reduction in the mortality of 42·6 per cent. was effected in the first week of the visitation.* As it might be objected that this was merely the reduction natural to the decline of the epidemic, it is necessary to contrast it with the mortality in the Town district, where the epidemic had broken out at nearly the same time, and which was then only partially under visitation. In the week preceding the visitation the mortality from cholera and diarrhœa was 31 cholera and 4 diarrhœa. In the week succeeding it was 36 cholera and 2 diarrhœa, thus showing an increase of 8·5 per cent. on the previous week, and a difference, as compared with the Hackney-road district, of 50·1 per cent.

“Up to the evening of the 7th September, which may be fairly called the first week of the visitation, as it was not properly organized till the 4th, no less than 1025 cases of diarrhœa, 38 cases of approaching cholera, and 4 corpses had been discovered by the visitors.

“In the second week the following were the results :—

1331 cases of diarrhœa,
26 cases of approaching cholera,
8 cases of cholera, and
2 corpses were discovered.”

Progress of the House Visitation.—In consequence of the great population in Bethnal-green, and the poverty which exposed large numbers to the exciting causes of the epidemic, the General Board, on Dr. Gavin’s representations showing the necessity of the measure, ordered, on September 10th, that four additional legally qualified medical visitors should be appointed. This order was not acted on by the guardians till the 20th. The staff of eight medical visitors was kept

up till the 19th October, when it was reduced to four, and was finally broken up on October 23rd.

In the Appendix a most instructive table is given, showing the daily progress of the house visitation in this parish, together with the cases of diarrhoea and cholera to which assistance was administered by the ordinary medical officers, both at their own surgeries and on their visits. To this document I would solicit special attention, as it places in a prominent light many of the more important points connected with the epidemic, and the application of preventive medicine. (See Appendix, No. 11.)

The marked superiority of house visitation in leading to the detection of premonitory attacks is made manifest by the facts set forth in the accompanying table, in examining which it should be borne in mind that it includes a period of fifty-four days, namely, from August 31 to October 23, 1849; that eight medical visitors was the staff employed, excepting for the first six days, and during the last week, when the number was less; and that there are five ordinary medical officers.

	Diarrhoea.	Approaching to Cholera.	Cholera.	Corpses.	Total Cases.
Eight medical visitors. . .	9,833	120	39	8	..
Surgeries and medical offices	3,415	221	78	..	..
Five ordinary medical offi- cers }	596	168	265	..	..
Workhouse	50	2	58	..	..
Total	13,894	511	440	8	14,853

It will, of course, be understood that many of the diarrhoeal cases discovered by the visitors would have received assistance from the ordinary parochial surgeons had there been no house visitation; but after making due allowance for this, it is evident, from the enormous amount of diarrhoea thus discovered, and from the experience of other parishes where the preventive system was not adopted, that, but for the measures pursued in Bethnal-green, a large number of these 9953 persons would not have applied for medical aid, and that many of them must have fallen victims to cholera. In examining the table in the Appendix it is further important to remark, that, when the visitors first commenced their duties, they discovered proportionably many more cases approaching cholera, and of cholera itself, than subsequently when the system was in full operation, and this although the epidemic in the metropolis generally continued to prevail actively. Thus in the first ten days the visitors discovered fifty-four cases approaching cholera, or very nearly half the number discovered by them in the whole period of fifty-four days; whilst in the last twenty-one days they only found out ten such cases. So, again—which is a more obvious though not a more certain test of the value of this plan—in the first ten days the visitors discovered no fewer than twenty-four persons suffering from developed cholera, who had till that time received no medical aid; whilst in the remaining forty-four days they only discovered fifteen such cases, owing, it is evident, not merely to the gradual subsidence of the epidemic, but

also, and in an important degree, to the prompt treatment afforded, by which, as Dr. Gavin expresses it, "the cholera cases may be caught up in the earlier stages, and prevented from arriving at their full development."

In a metropolis like London, and in which, it must be remembered, the house visitation was only very partially carried out, it is impossible to demonstrate the direct influence of these preventive measures on the total mortality. All that can be done, beyond stating the general results of the system, is to give instances of limited districts. The following is one such example. Dr. Gavin reports that in the districts placed under visitation in Bethnal-green, after taking great care to

"include every case of the disease which can be discovered to have died elsewhere, but which could fairly be attributed to the district, a reduction in the mortality of 42·6 per cent. was effected in the first week of the house visitation."

It has already been explained that, in such marked instances of reduction as these, it has been said that the diminution ought rather to be attributed to the decline of the epidemic than to the preventive means adopted. For the sake of humanity it is desirable there should be no incertitude on such a cardinal point; and I have therefore been always solicitous that satisfactory evidence should be adduced of the actual bearings of the case. To meet such objections in the present instance, Dr. Gavin states,—

"It is necessary to contrast this diminished mortality in a district under visitation with the mortality in the 'Town District,' where the epidemic had broken out nearly at the same time, but which was then only partially under visitation, one visitor only being employed. In the week preceding visitation the mortality was 35, and in the week succeeding it was 38, thus showing an increase of 8·5 per cent. on the previous week, and a difference as compared with the Hackney-road district (under visitation) of 50·1 per cent."

Conclusions.—Dr. Gavin, to whose judgment, zeal, and indefatigable exertions, seconded by the devotion of the medical visitors, and by the co-operation of John Howard, Esq., the chairman, and Mr. Brutton, clerk of the Board of Guardians, these great results are mainly attributable, gives the following summary of the house visitation:—

"It thus appears that, in 54 days, no less than 14,845 persons received gratuitous medical relief, of which number 9992 were discovered by the medical visitors to be actually suffering from choleraic disease. This gives a proportion of 1 in rather more than every 8, or, in decimals, 1 in every 8·51 inhabitants, who were discovered by the visitors to be actually ill from choleraic disease; and 1 in every 5, or, more exactly, 1 in every 5·19 inhabitants, who were treated at the public expense. This proportion is so great as to prove two facts:—First, that choleraic disease prevailed in this parish to an enormous extent; secondly, that the means used to check the disease were most efficiently brought home to a very large proportion of those who were affected. On the very first day of the visitation, with but one visitor, 4 cases of unattended cholera were discovered; and on the next day 3 cases. On the third day, with two visitors, 3 cases, likewise, were discovered.

"It further appears that, within four days after the visitation had been thoroughly organized, 47 cases of approaching cholera, 24 cases of cholera, and the corpses of 5 persons who had received no medical relief whatever,

were discovered. These numbers formed the following proportions of the total amount of the same kind of disease discovered in the whole of the remaining period of the visitation:—39·2 per cent., 61·5 per cent., 62·5 per cent.; thus proving that immediately on the commencement of the visitation the disease received a marked and sudden check.

“The total number of cholera cases which came under treatment during these nine days, exclusive of the workhouse cases, which, of course, were not amenable to the system of visitation, amounted to 183, while only 199 came under treatment during the subsequent 45 days.”

“The disease is thus shown to have been remarkably amenable to measures of prevention when carried out with vigour and promptitude; and I am positive I understate the truth when I give it as the result of all my experience and knowledge, that, with these measures in full operation at the commencement of the epidemic, and before the severe outbreak on the 11th and 12th of August in the Town and Hackney-road districts had taken place, the lives of three-fourths of those who subsequently perished in the spots already defined as the hot-beds of disease might have been saved.”

This important and voluminous Report on Bethnal-green is thus brought to a conclusion by its talented author:—

“I have now to express my gratification at the cordial reception which the Clerk to the Board of Guardians, Mr. Brutton, manifested towards me, and the deep sense I entertain of the value of his services in securing that harmony of feeling and unity of action so essential when measures of energy require to be promptly executed.

“From Mr. Howard, the chairman, I likewise received willing co-operation. Without the aid of these two gentlemen, I am satisfied I could not have effected the saving of life which it is my profound conviction resulted from the measures I had the honour, under your Board, to superintend the execution of.

“I cannot look back to the regularity with which the visitation was carried on in this parish, and the vast results accomplished by it, without believing it to be the most complete experiment ever yet made in this or any other country to meet the demands, on the skill and energy of the followers of medicine, created by the stern necessities of a prevailing plague.

“In concluding this Report, I would observe that the work of prevention was set about right earnestly, and that the emphatic words of the Registrar-General, ‘the vast task of the physical amelioration of the population demands the energies of the best men in her Majesty’s dominions,’ were made the watchword of those employed in the service. To the inquiries ‘Who will go out against this enemy’ (cholera)? a reply was attempted to be vouchsafed. To the further inquiry, ‘Will no glory crown its conquest?’ the response has yet to be made. The great work which has been achieved in restraining within bounds the mortality and spread of this dire disease among a population so peculiarly predisposed to its ravages, has been the corollary to the facts stated, that, ‘as medical skill is of most avail at the beginning and end of a fever, as the effect of the engines is most conspicuous at the outbreak and end of a conflagration, and as most energy is demanded when the wreck nears the shore, so it is in an epidemic, which, if it has not been checked at first, may yet be cut short and combated as it declines.’ But while a great triumph has been accomplished, and the enemy subdued, the fact still remains, that ‘to remove the evils which make cholera and all epidemics fatal will be no easy task.’

“It is to be hoped enough has been made manifest in this record to demonstrate that, without a great improvement in the condition of the dwellings of the people, no benefit but of the most ephemeral character can be justly anticipated from the late labours of the medical superintendents and visitors or of the parochial authorities.”

SHOREDITCH.—By orders of the General Board, dated August 15th and 23rd, 1849, it was directed—

1. That 3 medical visitors be appointed.
 2. That 3 lay visitors be appointed.
 3. That, in addition to the existing surgeries of the medical officers, 3 dispensaries or depôts be provided in suitable situations, and to be open night and day, with sufficient medical aid for all who may be attacked by cholera or any of its premonitory symptoms.
 4. That the existence of these depôts and surgeries be made known by handbills.
 5. That such a number of efficient nurses be provided as in the opinion of the medical officers of the parish, or of a medical superintending inspector, shall be deemed adequate.
 6. That a house of refuge be provided.
 7. That two inspectors of nuisances be appointed.
- Lastly. That a house or suitable rooms in convenient localities be provided, to furnish adequate hospital accommodation for those who cannot be properly treated at home.

Dr. Gavin reports that on August 24th, when he was instructed by the General Board to superintend this parish, some of these provisions had been carried out: thus three additional medical officers and the lay visitors were appointed; but the former were merely made supplementary parish attendants, and only visited in the course of their routine duties if called into what they considered an unhealthy locality: "there was no system; and the house-to-house visitation was not properly understood." The 3rd provision was partially adopted; the 4th provision was carried out; the 5th provision was never carried out at all, nor were the house of refuge and hospital provided. On August 31st three additional lay visitors were ordered and two were appointed. A sufficient staff of men with all proper materials were also ordered to be kept in constant readiness to cleanse and lime-wash houses where cholera has occurred, and in such other instances as the medical officers shall direct: "this provision was adopted by the local Board, and was in a few instances carried into effect, but as a general measure it was neglected."

It was also directed that provision be forthwith made to secure additional supplies of water for the purpose of a complete and frequent washing of the courts and other confined localities. "A few courts were washed, but, as a general measure, it was not efficiently carried out, chiefly in consequence of the Water Companies neglecting or declining to afford the necessary supply of water."

It was the 28th of August before anything like a regular return of the cases of diarrhœa and cholera discovered by the lay visitors could be procured; but subsequently a regular daily return was sent in by Dr. Gavin to the General Board.

On September 6th an additional medical officer was ordered for the workhouse, in which cholera extensively prevailed; and after some delay the appointment was made. On the 8th of September, as the registered deaths were still excessive in this parish, an order was issued for four medical men to be employed as house-to-house visitors; this provision was carried into effect.

Results.—These were the measures directed by the Board of Health, and the general results may be gathered from the following statement:—

“The number of persons who received the benefit of remedial treatment at the hands of the medical officers of the parish was very great. It appears according to my tables,” says Dr. Gavin, “that no fewer than 8742 cases of diarrhœa, 30 cases of approaching cholera, and 11 of fully developed cholera, besides 8 corpses, were discovered by the visitors. 12,873 persons applied for and received relief at the three surgeries of the medical officers, viz.—

Diarrhœa	12,374
Approaching cholera	313
Cholera	186
Total	12,873 ”

It thus appears that, by the provisions directed by the Board of Health, in the period from August 28th to October 25th, no fewer than 21,116 cases of choleraic diarrhœa, 343 cases of approaching cholera, and 197 of developed cholera received prompt medical treatment. It is of course obvious that a portion of these cases would have been relieved by the ordinary staff, if no extra aid had been provided.

From September 6th to October 20th the ordinary medical officers visited and treated 854 cases of diarrhœa, 243 of approaching cholera, 185 of cholera. In the workhouse 188 cases of diarrhœa, 13 of approaching cholera, and 42 of developed cholera occurred.

Dr. Gavin reports,—

“With regard to the cases of diarrhœa and of approaching cholera discovered by house visitation, one only of the former and two only of the latter are known to have passed into cholera.”

These results being so remarkable, it is proper to state that Dr. Gavin took every possible precaution to secure accuracy. He met the medical visitors, as already stated, every night, to receive a detailed account of the day's work; and thus, whatever case of premonitory attack passed into cholera after being discovered and treated by these gentlemen was reported. But,

“as it might have happened that some of the cases discovered by the lay visitors subsequently passed into cholera while under the charge of the parochial medical officers, I instituted inquiries,” says Dr. Gavin, “with reference to that point.”

The subject is one of such importance as to require the insertion of one or two of the replies received from these gentlemen:—

DEAR SIR,

24th October, 1849.

MY experience does not furnish me with a solitary case of simple diarrhœa under treatment terminating in cholera.

(Signed)

ALFRED C. BOWER.

DEAR SIR,

23rd October.

I HAVE the highest opinion of the lay visiting; I believe it to have been the most efficient of any of the regulations issued by the Board of Health. I know of no case of simple diarrhœa sent me by the visitors passing into cholera. I am of opinion that a great part of the diarrhœa we have had has been modified cholera, and not the simple disease as heretofore.

(Signed)

W. W. COWARD.

MY DEAR SIR,

October 24th, 1849.

I AM not aware of any cases sent me by the lay visitors of simple diarrhœa having subsequently passed into cholera; but from the continued application of such cases, and nine times out of ten not knowing by whose authority they came, it is impossible to speak positively on the subject; but certainly my impression is that very few cases indeed, if the treatment were adopted whilst in the stage of diarrhœa, came into cholera at all.

(Signed) W. W. BURCHELL.

It may, therefore, be safely concluded from this scrutiny, even supposing that some few cases did pass into collapse unknown to the visitors, that the results of seeking out and promptly treating diarrhœa in this parish were pre-eminently successful, preventing a large number of patients from falling into the fatal stage of collapse.

HACKNEY.—Up to the time when the preventive measures of the General Board were first instituted in this parish, namely September 5, 1849, there had occurred 93 deaths from cholera, several of these happening in January and February. The proceedings of the guardians in this parish were highly creditable, and distinguished by an earnest desire to arrest the ravages of the epidemic. They adopted without a moment's delay the recommendation of Dr. Gavin that two extra, in addition to the four ordinary medical officers, should be appointed, thus avoiding the delay incidental to the issuing of an order of the Board of Health. They at once instituted six dispensaries at the houses of the medical officers for the gratuitous distribution of medicine to all applicants; and the surgeons were directed to visit all poor persons who should apply on account of choleraic disease. The guardians likewise agreed to the appointment of four medical visitors. Several wards in the workhouse had already been fitted up as a cholera hospital. Provision was also made in this establishment to receive families in which deaths from cholera had taken place; but no families or persons could be induced to remove to the workhouse.

Visitation commenced.—"On the 7th September, 1849," reports Dr. Gavin, "the system of medical house visitation was commenced; three visitors began their labours on that day, and on the 10th a fourth was added. The number of the staff was maintained till October 21st. It is proper here to observe, that the gentlemen of whose assistance I was thus enabled to avail myself performed their duties with an earnestness and a desire to carry out the system in all its entirety, which were at once honourable to themselves, satisfactory to myself and to the Board under whom they were appointed, as well as most serviceable to the inhabitants of the locality."

Results.—In order to obviate all sources of error as to the influence of these preventive measures on the mortality of Hackney, Dr. Gavin consulted the local registries of death, and by other inquiries on the spot ascertained the precise date of each death, thus avoiding the fallacies inseparable from the weekly returns of the Registrar-General, in which deaths occurring in one week may occasionally not appear till some time subsequently. With these precautions—

"It appears that the deaths, which for the six days preceding the visitation, and on the day on which it was commenced, had been 14, that is, 13 labourers and one tradesman, fell during the next seven days to 10, of which 10 two were imported cases and three tradesmen; being a reduction of 67 per cent. in the preventible deaths."

This marked reduction, which more or less was observed in all instances where the house visitation was adopted, cannot be attributed to the general decline of the epidemic in the metropolis; for although some reduction did take place in the week ending September 15, it was, when compared with that of the preceding week, ending September 7, in the ratio only of 1682 to 2026. On examining the results more in detail, they will appear even more important. In the first week of the visitation 815 cases of diarrhœa and fifty cases of approaching cholera occurred, and were thus distributed:—

	Diarrhœa.	Approaching Cholera.
Medical visitors	174	42
At the surgeries of medical officers	160	3
Medical officers	181	5

“The great value of the system of medical visitation is rendered most obvious by the above comparison, which exhibits more than 13 cases of diarrhœa discovered by the visitors as compared with five coming under the charge of the regular medical officers; and a proportion of more than 14 to five as compared with the numbers which would voluntarily apply for remedial aid, even with every facility to obtain medicine and advice freely supplied to them. The value of the system is still further manifested in the great proportion of cases approaching cholera, which would not otherwise have come under treatment at all until a large proportion had absolutely passed into the fully developed stage of the disease.”

The subsequent weeks gave similar results.

The following is the summary of the house visitation in Hackney:—

“Of the whole number of 2120 cases of diarrhœa discovered by the visitors not one passed into developed cholera, though several advanced as far as rice-water purging, vomiting, &c. Of the 73 cases of approaching cholera, one only passed into cholera—its result was fatal.”

Seven cases of developed cholera that had received no medical aid were also discovered by the visitors.

Dr. Gavin thus concludes his Report on Hackney:—

“In concluding this Report I would beg to express my conviction that the inhabitants are under a debt of gratitude to the Board of Guardians for their prompt liberality in all matters connected with the prevention of the spread of the pestilence, and for their ready desire to accede to all the recommendations which I considered it my duty to lay before them.”

CLERKENWELL, ST. LUKE'S, ISLINGTON, and WHITECHAPEL.—The parishes of Clerkenwell, St. Luke's, St. Mary Islington, and Whitechapel Union, were, so far as the preventive measures of the Board of Health were concerned, placed under the superintendence of Mr. Liddle, formerly one of the medical officers of Whitechapel, and who has paid much attention to the sanitary question. This gentleman thus commences his Report:—

“The beneficial results that followed the appointment of a staff of medical men, for the purpose of house visitation, were soon manifested in the parishes of Clerkenwell, St. Luke, Islington, and Whitechapel, by the discovery of numerous cases of diarrhœa, a complaint which is admitted by all the visitors under my superintendence to be a premonitory symptom of cholera. Many of the persons thus suffering would not, according to the opinion of the visitors, have applied for medical aid, and would, but for the timely assistance they received, have passed into cholera.”

The general results of the system in these parishes, of which the details are given in a table prepared by Mr. Liddle (see Appendix, No. 12), are as follows :—

	Diarrhœa.	Approach- ing Cholera.	Cholera.
St. Luke's	890	20	13
Islington	1,302	70	16
Clerkenwell	431	25	8
Whitechapel	755	7	15
Total	3,378	122	52

The number of premonitory cases which passed into cholera after treatment by the medical visitors was not kept distinct from the same class of cases treated by the medical officers of these four parishes; and therefore all that can be stated is, that the parochial surgeons, from September 8th, 1849, to October 4th, 1849, treated 3780 cases of diarrhœa and 237 cases of approaching cholera; to which number must be added 1118 cases of diarrhœa, treated in three months by Mr. Harston, of Islington (not one of which died), making a general total of 8276 attacks of premonitory diarrhœa, and 359 cases of approaching cholera, of which 35, or 4·2 in a thousand, passed on into developed cholera or collapse. Mr. Liddle, who was most anxious to obtain accurate information, adds, that “the returns of the number of diarrhœa cases which were attended by the medical officers of Islington are very imperfectly recorded in the table.”

It will be perceived that the number of cases which, in these districts, passed on into collapse notwithstanding treatment in the premonitory stage, is much larger than in Bethnal-green, Shoreditch, and Hackney. It is, however, necessary to notice two points in reference to this difference: in the first place, the 35 cases did not occur in the practice of the medical visitors exclusively, but also in that of the medical officers; and it is certain, as already explained, that the premonitory cases, taken collectively, were seen at a later stage of the attack by those officers than by the medical visitors; and therefore a larger proportion of them were likely to go on uncontrolled by medicine. In the second place, it appears from the note appended to Mr. Liddle's return that more attacks of diarrhœa than are included, occurred at Islington. From the general experience of London, I feel myself justified in affirming that, where premonitory cases of diarrhœa are seen at a very early stage, which ought to be the result of successful house visitation, the attacks passing into collapse will not be so high as 1 in 250.

Mr. Liddle's Report contains several interesting letters from the medical officers of the above parishes. The following are a few extracts. Mr. Byles, one of the surgeons of Whitechapel, says that in Mile End New Town there were multitudinous cases of diarrhœa, which generally yielded to ordinary treatment. This gentleman, who is an excellent practitioner, adds,—

“The opportunities of seeing the dejecta were not very numerous; but my opinion is, that in the diarrhœa cases the gall-bladder was usually

loaded, and that sufficient bile did not pass into the intestines to induce one to call the premonitory diarrhœa bilious; but that the excretions were serous from the first, a conclusion at which I arrive partly from the remarkably depressing prostrating effect produced in robust adults by one or two evacuations."

Mr. Hart, another surgeon of Whitechapel union, says,—

"Out of 93 cases of which I took notes, 34 only are known to have had previous diarrhœa, 40 none whatever, and of the remaining 19 I have no satisfactory evidence upon this point." "I met with no case of bilious diarrhœa passing into cholera." "The number of simple diarrhœa and bilious cholera cases that were treated by me from the beginning of June to the end of September, 1849, amounted to 2067, opium being in the greatest part used, and this appeared to have almost a complete control on these affections."

Dr. Allison, of Whitechapel, who saw a large amount of the disease, having the district of Rosemary-lane, states,—

"that in his opinion the majority of cases of cholera were preceded by diarrhœa, in some for several days, in others of only a few hours' duration." "Some of the cases, however, were decidedly sudden; the severest inquiry failed to elicit any evidence of preceding diarrhœa."

The Rev. W. W. Champneys, Vicar of Whitechapel, provided medicine at his own expense for a large number of persons labouring under premonitory symptoms, and with the happiest results, 1000 cases having been thus relieved. (For an important letter of Mr. Champneys on this subject, see Appendix, No. 13.)

ST. GEORGE, HANOVER-SQUARE, KENSINGTON, AND CHELSEA.—In consequence of Dr. Waller Lewis having been instructed by the General Board to proceed to Redruth, in Cornwall, where a severe attack of cholera occurred, 17 days after he had been appointed to superintend the house visitation in four of the western parishes, the returns for these districts are not complete. The parishes were those of Kensington, Chelsea, St. George, Hanover-square, and St. Margaret's and St. John's, Westminster; in the last named, however, the system was very imperfectly carried out, and was discontinued before Dr. Lewis visited it. The following extracts from this gentleman's Report embody his experience:—

"It is to the early detection of this dreadful scourge, and its treatment in the first stage, that we are to look almost to a certainty to combat this malady. As I have said before, I believe that the exceptions are very rare in which simple diarrhœa is not one of the first symptoms.

"Just as all sorts of remedies have been tried in the first stage and found to fail, so have all kinds of astringent medicines been used for the first stage with an opposite effect. Brandy and opium, opium by itself, chalk mixture, sal volatile and tincture of henbane, infusion of oak bark, all have had their advocates, and all seem to have succeeded equally in cutting short the disease. Very few cases indeed appear to have resisted remedies, if given early in the attack. All the evidence received goes to prove the efficacy of medicine in checking and arresting the premonitory diarrhœa.

"Mr. Jones, of West Brompton, says, 'I have attended a large number of cholera cases, as well as a great many in the early premonitory stage; I know of only one case where these symptoms had been attended to which ran into confirmed cholera. In that case it was the effect of the man's committing an imprudence by getting drunk, and I succeeded in saving his

life.' He adds, 'I firmly believe that, had the premonitory symptoms been attended to in all cases, we should not have had to deplore the very great fatality that we now have.'

"The visitors in the western districts of London, during the few weeks they were engaged, discovered upwards of 7000 cases of premonitory diarrhœa; but the most careful inquiries that I instituted on the subject showed that, out of this number of cases brought under treatment, seven only were not arrested, and passed on into confirmed cholera.

"From my own experience and observation, confirmed by that of almost every medical man in London and the country with whom I have communicated on the subject, I have no hesitation in saying, that the only means of securing safety for the community, when this disease once shows itself as an epidemic, is to adopt at once the most perfect plan possible of discovering the disease in its earliest stage. Experience has shown that the generality of persons will not send for medical assistance till this aid can no longer be of service to them.

"I am of opinion that the system of house-to-house visitation by medical men, attached to the union medical officers, is the best method that can be pursued for discovering and bringing under immediate treatment all cases of commencing cholera.

"As was the case in all the other districts under my superintendence, the house-to-house medical visitation was not commenced soon enough (this refers to the parish of Kensington), but when in full operation its good effects were most forcibly felt. The number of cases of cholera quickly diminished, and a greater proportion of recoveries took place in those who were attacked. After a certain time the worst form in which the disease showed itself was that of rice-water purging, or choleraic diarrhœa; and when the visitation had been in force a little longer, even this severe form of the diarrhœa became scarce, and the disease made its last expiring efforts in the form of simple feculent diarrhœa, a stage in which it could be mastered almost with certainty."

The following instance will demonstrate the advantages that were derived from the plan of house visitation. In the parish of St. George, Hanover-square,

"I was informed," says Dr. Lewis, "that the Board of Guardians had given the medical officers *carte blanche* to take any measures they considered necessary during the raging of the epidemic, as to engaging extra medical assistance. To the date of the 24th September these gentlemen were of opinion that no extra assistance was required, and that no time was lost in seeing persons directly they were taken with premonitory symptoms. At an interview on that day I heard, however, of two cases, which convinced me that the system was inefficient. One of the surgeons of the out-ward had been called the day before to two cases of cholera; the first was that of a woman who, though visited very quickly after sending for medical assistance, was dead when the surgeon arrived. The second was that of a child who only lived an hour and a half."

Dr. Lewis, after pointing out the necessity of discovering these cases in the first or diarrhœal stage, and the danger of continuing the system then in operation, proposed the adoption of house visitation, which being immediately acceded to by the medical officers, four assistants were engaged. It is important and instructive to mark the result:—

"From that time," reports Dr. Lewis, "although very many severe cases of diarrhœa were discovered and treated, the medical officers were not called upon to attend a single fresh case of cholera. The disease soon abated, so that the visitors were dispensed with after having been employed a fortnight. During that time they discovered about 290 cases of premoni-

tory symptoms, nearly 40 of which they believed would have run into cholera if not brought under treatment."

Among the many proved advantages of the system of the Board of Health, by which assistance was brought to the dwellings of those attacked, there is one that has not attracted the notice to which it is entitled, but which will be readily recognised by all medical practitioners. In the treatment of severe diarrhœa, and especially of that connected with cholera, it is a point of primary importance that the patient should be kept perfectly at rest and in the recumbent position; all exertion tending to bring on the discharges. Now, when among the poor medical aid is to be sought for, the persons actually suffering, as was proved in the late epidemic, either from ignorance of the danger thus induced, or from necessity, very frequently make the application themselves; they have thus often to walk a considerable distance, which, in the extreme debility so often accompanying choleraic diarrhœa, is liable to aggravate the mischief; this circumstance alone, I feel assured, was the cause of many cases resisting treatment and passing on to collapse prior to the introduction of the preventive measures.

Testimony of the Medical Visitors.—Having given these extended extracts from the Reports of the inspectors, I may add that the amplest testimony is borne by the gentlemen employed as medical visitors to the efficiency of the visitation system; they are of one opinion, that it is the only effectual method of discovering the premonitory symptoms, and of preventing by prompt treatment such attacks passing into cholera. In Southwark, where, however, owing to circumstances over which the Board of Health had no control, the house visitation was on the whole very imperfectly carried out, Mr. Walsh reports that the medical visitors were unanimous as to the efficiency of the system, and adds, "I believe it to be the method of treating cholera, or rather of preventing it, as far as human means can prevent it."

The following statement may be introduced, as it illustrates a feeling which was shared by many of the medical officers before the working and advantages of the system were understood, and also sets forth in striking but perfectly true terms the exact steps of this frightful disease, and the mode by which it may be combated. Mr. Benington, for two months an assistant medical officer, and for one month a visitor in Lambeth, thus expresses himself:—

"At first I regarded the project of house visitation with perfect contempt; but whilst employed as a medical attendant on cholera cases, and with no expectation of becoming a visitor, I became a sincere convert to a belief in its utility. I observed a fatal disorder making its approach in the guise of a simple and apparently harmless ailment, or painless diarrhœa, and only developing its virulent character when it had, as it were, obtained possession of the very citadel of life; there rarely seemed but a single step between this premonitory symptom and the almost hopeless stage of the disease: it was like a man stepping from a precipice when no mortal power could arrest his downward career. It was evident to me that this disease could alone be successfully grappled with when the diarrhœa gave warning of its approach. But the difficulty was to meet with it in this early stage: unconscious of the approaching evil, the sufferer from diarrhœa continued in the pursuit of his usual calling, and in this state of dangerous security was but too frequently surprised by death. The system of house visitation supplied the means of encountering the malady at the only period when

there was a chance of success. The design appears to have been to raise an army of medical men, whose office it should be to take the entire population of a town or city under its protection, ready to combat the disease on its first appearance, and to remove all causes capable of favouring its approach. It might deservedly be termed a great and comprehensive scheme. In Lambeth only five visitors were employed at the height of the epidemic. I perceived the worth of this system, and what might be accomplished through its agency when in complete operation; for although it is true that after the adoption of house visitation the disease assumed a more intense character, and the mortality occasioned by it greatly increased, yet, when I observed that in nearly every case of cholera to which I was summoned there had been neglected diarrhœa, and when I also became acquainted with the fact that numerous cases of diarrhœa were daily discovered in my district by the medical visitor, and successfully treated by him, it was evident that, but for the exertions of this gentleman, the number attacked with cholera would have been far greater, and a consequently greater loss of life have ensued."

The following important letter places the advantages of the system in a striking point of view:—

"We, the undersigned medical visitors of the parish of Saint Mary, Islington, having been engaged during the last three weeks in visiting the poor from house to house, and in diligently searching for cases of diarrhœa and cholera, do hereby testify to the beneficial results which have hitherto accrued from our labours:—

"1. We have, under this system, been enabled to detect numberless cases of diarrhœa, and to prevent by early and judicious treatment the transit of such cases into the more dangerous form of rice-water purging, or into the actual state of collapse in cholera.

"2. By making such inquiries in every house among the poor we have found that many cases of diarrhœa have been subjected to treatment, which otherwise, from the carelessness of the individual, or from the prejudice they have to calling in the aid of the parish medical officer, would have been wholly neglected.

"3. Not only has the health of the poor inhabitants of this parish been preserved by well-timed medical treatment, but the sanitary condition of their residences has been thoroughly investigated; all nuisances have been pointed out to the Medical Superintendent, and the causes, as well as the disease itself, have in many instances been removed.

"4. On making inquiries at the various houses relative to the existence of disease in the families of the poor, we were for the most part well received; and our visits have been acknowledged with the warmest expressions of gratitude.

"5. So far from our visits having excited the least intimidation or alarm among the poor by making such inquiries, they have invariably tended to inspire confidence in their minds.

"6. In numerous instances, families in the greatest want and inanition have, by the liberality of the trustees of this parish, been relieved by proper and substantial food, whereby the bodily strength has been fortified and the access of disease prevented.

(Signed) "JOHN COWARD, Minerva-terrace.

JOHN RICHARDSON, 28, Camden-place.

WILLIAM PURDY, 11, Saint George's-terrace.

ROBERT SCOTT, Upper Barnsbury-street.

THOMAS GRAHAM, 2, Esther-place.

HUGH CAMPBELL, 11, Saint Paul's-terrace.

WILLIAM ANDREWS, 16, Brunswick-place.

"September 28, 1849."

One of these gentlemen, Mr. *Richardson*, further adds,—

“Persons generally speaking refuse to send for the parish officers; and the visitors have found cases of actual cholera which were unattended by any medical man, in consequence of the refusal to send for the parish surgeon; in such cases the visitors considered it to be their duty to give their attendance.”

Mr. *Wells*, a medical visitor in St. Luke's parish, states—

“that he has had five cases of cholera in its second stage of rice-water purging and vomiting, which would have gone into collapse, and ultimately perished, had he not discovered them.”

He further adds—

“that at least one-third of the persons he called upon, who were suffering from diarrhœa, would not have asked for medical aid, had he not insisted upon its necessity.”

Mr. *Leake*, a medical visitor of the Whitechapel Union, writes as follows:—

“In one day I discovered five cases of developed cholera, in none of which I believe the patients would have applied for medical aid. I also discovered a very large number of premonitory cases which, I have no doubt, if they had not been found out, would have terminated in cholera. I found that after visiting my district, and carefully attending to all cases of diarrhœa, and advising the people to keep their dwellings and persons clean, cholera gradually diminished. I have no hesitation in saying, that many cases of serous purging discovered by me would have passed into the worst form of cholera, had they not been checked.”

The testimony of the four medical visitors of Clerkenwell is equally favourable.

Many striking examples of the great benefit of early treatment have come under my notice, which exemplify, in special cases, what has been so amply proved by the general results as shown by the official returns. One instance only can here be quoted. Mr. Tovey, one of the medical officers of Bermondsey, where the disease was very destructive, says—“he has remarked that, among the better classes who have been attacked lately, there have been proportionally more deaths than among the poor, which he attributes to the latter being so early treated: among the poor” (this refers to August 13th, in the very height of the epidemic) “there has been an immense amount of bowel complaint which has been controlled.” The same fact has been noticed in other parts of England and Scotland.

Sanitary Evils discovered by the House Visitation.—It is necessary to state that the successful management of the epidemic was not the only, though it was the most striking, advantage resulting from the system of domiciliary medical visitation. In every part of the metropolis where the plan was carried out, a vast number of nuisances and sanitary evils of every description were detected and immediately reported to the local authorities. In many instances prompt measures were thereupon adopted for the removal of the defects; but I regret to state, it not unfrequently happened that the reiterated complaints of the medical visitors were of no avail. The following extracts from Mr. Walsh's Report will suffice to explain the character of these proceedings, and the difficulties attendant on efficient amelioration:—

“The visitation has shown how much some of these sanitary evils require a fresh eye to find them, and indefatigable and independent representation of them in the right quarter. The uncleansed streets, the full cesspool, require both firm and frequent representation to the proper officer, and a rigorous enforcement of the law. The undrained and unpaved court, the unventilated, unwatered dwelling, require frequent appeals to the owner and occupier. The noisome trade requires the still more energetic notice of the nuisance inspector or of the magistrate. The untrapped gully-hole, the unsewered street, the noxious open ditch, are evils requiring larger measures and stronger powers. For a progressive improvement in the houses and habits of the people, I conceive that a system of medical inspection by an officer having no local connexion would be the best security. The making an inquiry into the cause of death should be the rule, not the exception. I have known a case of diarrhœa passing into cholera and death without the medical officer seeing it; yet he gave a certificate of the cause of death. I have also known instances where the cleansing of houses or courts, removal of uninfected persons, or other sanitary precautions, have been enjoined, but neglected, and where death has ensued; yet the cumbrous and uncertain process of a coroner's inquest, even if it could be obtained, was the only mode by which the facts could be verified, and the blame laid on the offending parties.”

The amount of sanitary evils of every kind reported by the medical visitors is almost incredible; a general idea of them may be gathered from the facts stated in a preceding section.

It has already been stated that in several parishes, in consequence of the reports either of the inspectors of nuisances or of the visitors, improvements and cleansing operations were effected by the local authorities; but it is proper to explain, it is the concurrent opinion both of the medical inspectors and visitors that these proceedings will not be permanent; and in corroboration of the correctness of this conclusion, I may state that, in most of the parishes where during the epidemic inspectors of nuisances were appointed by the guardians, these officers have since been dismissed. Unless, therefore, some other measures be adopted, it is certain that in the most populous and poor districts a return to the old state of things will speedily, if indeed it has not already occurred, take place. In some of the largest parishes, as the evidence of the visitors proves, little or no improvement was effected. Such statements as these are very common in the reports:—“None, that I am aware of;” “None whatever;” “Very little;” “Little done yet, in proportion to what there is and ought to be done;” “I have inspected the district; and affirm that its sanitary condition is worse now than three months ago;” “None;” “I can see no improvement;” “Very little attention is paid to any representation of sanitary evils.”

Data for conducting House Visitation.—If, owing to a return of cholera, the necessity for house-visitation should again arise, in order to ensure full efficiency to the system, several points would require to be determined. Among these, one of the first would be, to ascertain the number of families in the districts likely to be affected, so that a basis for future operations might be obtained. To obtain such necessary information in the interval of the epidemic attack would obviously form a part of any wisely devised scheme for the application of preventive medicine; since, as was abundantly shown in the late visitation, in the absence of these details, those who are officially called

on to protect the public health must experience the greatest difficulty in ascertaining, even approximately, the amount of extra medical aid that the emergency demands.

Number of Families capable of Visitation.—Another main desideratum is to determine what number of families can, in one day, be efficiently visited by one medical man. This question was, therefore, proposed among others by the Board of Health, in a circular addressed to the visitors; and in reply a large number of answers have been received. The circumstances principally affecting this point will be—first, the density of the population, and the consequent area of the district; secondly, the expertness of the visitor, and the time devoted to his duties; thirdly, the stage of the epidemic as to severity. A few of the replies are selected for future guidance. Mr. Molloy says,—

“When the system is first introduced into any district, the visitor must devote five minutes at least to every family to afford the necessary explanations: this will give 72 for six hours’ work—a very fair average. When, however, the object of this mission is well understood, he will obtain the command of a neighbourhood and population many times this number in consequence of the free intercommunion which exists in these districts.”

The visitors in St. Luke’s parish state that from 400 to 500 families can be visited in a day. Mr. *Welsh* thinks,—

“540 healthy families and 53 or 54 sick families, in the one case allowing two, in the other seven and a half minutes to each family, can be visited.”

Mr. *Cleave* states,—

“At the commencement, if diarrhœa was very prevalent, about 400; towards the latter part, when on the decline, about 600 families.”

Mr. *Jones* states,—

“In my district at Bethnal-green there were about 850 houses, and on an average about three families in each house: this will give 2550 families in all; but it was quite impossible to visit the whole of them separately in one day, the different families in each house being on different flats. One thousand is, I think, the greatest number of separate families that could be properly visited in one day.”

Dr. Jones, who was placed in a district where the houses are chiefly two-storied, and the number of families varies from three to five in a house, was able to visit from 300 to 400. Mr. Oscar Fox states that the number that could be visited would depend upon the number of cases of illness and pairs of stairs to be ascended. In a densely populated district, of very limited extent, I have visited 472 families in the day; but the fatigue was much too great to be sustained for any length of time. I should say that where the houses are of two, three, or four stories high, with families on each floor, 250 families would furnish a fair day’s work, supposing 25 of the number required medical investigation and prescription. In Lambeth, it would appear, there was more difficulty in the visitation. Thus, Mr. Ferguson says, from 200 to 300 families could be visited. Mr. Cox, in a country district, allowed four minutes to a family. Mr. Tuxford could visit from 300 to 600 families; and Mr. Benington, 500. Dr. Gavin states that if the object of the visit were previously made known, and if the visitors devoted, as was the case in Bethnal-green, nine hours a-day, each might

visit, under the ordinary pressure of zymotic disease, 500 houses, which, allowing two families to a house, would give 1000 families; the number decreasing in proportion to the severity of the epidemic.

On reviewing these several statements, it may perhaps be inferred that, with judicious arrangements, a visitor devoting eight hours could visit 500 families per diem; which, allowing five members to each, would give a total of 2500 persons. This estimate might thus be adopted in densely populated districts; but properly to appropriate the assistance in different localities, and to give efficiency to the whole plan, careful superintendence would be required, a provision which was adopted in various towns during the late epidemic, and with the best results.

Causes preventing the Discovery of Diarrhœa by Visitation.—It is essential, in this account of the house-visitation, to point out the causes which prevented cases of diarrhœa, really existing, being discovered.

1. Absence from home.—It will be obvious that the most general of these causes was the long absence from home. The bulk of the labouring classes, as regards the men and boys, leave early in the morning and return in the evening; many of them, owing to a multitude of employments, not even returning to meals. It happened in a large number of instances that persons having some slight bowel complaint in the morning went out to work, and then, from this neglect, returned at night much worse, or even in a state of approaching collapse; or, again, that attacks of diarrhœa came on late in the evening and were neglected, the individuals going in the morning to their employment as usual. Now, as the visitors ordinarily went round between nine a.m. and seven p.m., it necessarily happened that many cases of this kind escaped detection.* To meet the evil, in some few districts two visits were made, one early in the morning and the other late at night, so as to catch the people before going to and after returning from their labours. I feel assured that, to render the system perfect, some such plan as this must be adopted wherever the epidemic is severe.†

2. The absence from home of any member of the family qualified to give information.—Not an unusual occurrence among the poor; the only person in charge of several children being a girl of 8 or 9 years old.

3. The influence of the druggists.—Some depreciated the skill of the visitors, and so induced the poor to believe that they could only be guaranteed from danger by applying at their shops.

4. A feeling of delicacy on the part of females.—In one ascertained instance this led to loss of life.

5. Dr. Gavin mentions a cause which would scarcely have been expected, but which he found operating extensively—the fear, namely, on the part of the poor, of giving offence to their landlords, in consequence of being in arrear of rent:—

“If the poor complain of their houses the landlord steps in and takes all.

* The visits were often begun earlier and continued later.

† Dr. Gavin attributes the success of Mr. Chapman, one of the lay visitors in Shore-ditch, to his frequently and voluntarily commencing his rounds at, and even before, six a.m.

I have myself constantly found this fear preventing the disclosure of disease and of causes of ill health, and I have been entreated by the poor not to mention that they have informed me of their illness, or of the wretched state of their houses. In Ann's-place, Hackney-road, a most respectable mechanic nearly lost his own life, and the lives of his family, rather than make any complaint. The same feeling prevails almost universally among the poor."

Lay Visitors.—In some few parishes the medical officers employed respectable women to aid them to discover premonitory attacks; and the result appeared to be satisfactory. As this would of course be an economical measure, I was very anxious to ascertain if respectable men and women could be thus employed with advantage, but always in strict subordination to the proceedings of the medical visitors and medical officers; and in some few localities the plan was tried. The result on the whole was not encouraging, owing to a variety of causes, most of which, however, would not appear to be insurmountable. When the lay visitors are men, there is a great and natural difficulty as to females communicating with them as to their complaints; then it was difficult to find persons of suitable qualifications and conduct. Owing to these and other circumstances, the medical visitors, and some of the inspectors, are unfavourable to lay visitation. But I feel assured that, when the vast importance of seeking out persons affected with premonitory diarrhœa becomes generally known, if unhappily cholera should again break out, a well-organised plan of lay visitation would prove most beneficial. But to secure such a result, the zealous and sustained co-operation of the higher classes, and, more than all, of the clergy of all denominations, would be indispensable. The selection of the lay visitors would require the greatest caution; none but persons of fact, benevolent feeling, and proved good conduct should be chosen; females of a respectable, and even of a superior grade, would be the best adapted in many instances for the purpose; Scripture readers would also form a desirable class from which to select. It would be quite essential that the object of the procedure should be explained to the people by the medical men and clergy of the district, and by those benevolent persons, especially ladies, who visit and are known to the poor. But the great point would be to make the lay, work entirely in harmony with, and in subordination to, the medical visitation. When thus carried out in London, good results followed; thus, in Shoreditch, where five lay visitors were employed, Dr. Gavin says,—

"The chief use of the lay visitation was to place those affected with diarrhœa in communication with the medical officers, and to report nuisances. The first of these duties they performed to a great extent in Shoreditch; the dispensary returns (that is, cases relieved at the surgeries of the medical officers) exhibited a very large increase in the number of applicants immediately on the establishment of lay visitation under efficient superintendence, and this increased number was fully sustained to the termination of the epidemic. I think it fair to state that the lay visitors by sending so many to the dispensaries for relief greatly lessened the outdoor labour of the medical officers, and also diminished the number of cases which would otherwise have been discovered by the medical visitors."

In thus alluding to lay visitation, it is essential to guard against the error of its being supposed that this measure can ever be made a sub-

stitute for the employment of medical men in a district visited by cholera; none but properly qualified professional persons can afford efficient aid, or, as to the treatment of the disease, gain the confidence of the poor.

Testimony of the Poor in regard to the Preventive System of House-Visitation.—That a system thus capable of snatching thousands, almost within the very grasp of this fatal disease, from the terrible stage of collapse, should be regarded by the persons who were themselves in such perilous circumstances, and by their friends and neighbours, with any other feelings than those of gratitude, could not reasonably be anticipated; nor, when it was seen that an epidemic, which appeared to seize its victims suddenly and without warning, had almost invariably a premonitory stage of several hours' or even days' duration, in which, as if by magic, its course could, with but few exceptions, be arrested, would it be expected that alarm, in place of confidence, should be inspired. And yet one of the objections most generally urged by the local authorities against the substitution of the preventive system of house-visitation for the existing insufficient machinery was, that such a procedure would cause great alarm among the poor, and would thus augment the evil. In answer to such objections, I represented that alarm was already general among all ranks, owing to the number of attacks and the severe mortality; that to send medical aid into the midst of the afflicted districts, and thus to afford prompt and efficient treatment to those seized by the fatal epidemic, was obviously calculated to abate rather than to create apprehension; whilst the manifestation of such care on the part of the authorities would give to the inhabitants of the miserable courts and alleys of the metropolis, unmistakable evidence of active sympathy on the part of the higher classes in their fearful sufferings. But my urgent representations, or solicitations, as they might more properly be termed, were for the most part made in vain; and it was not, as it has been already shown, until a large number of victims had been swept away, or that legal means were adopted to enforce the measures of the General Board, that the system was at length adopted, and that most imperfectly. That this confidence in the good sense and right feeling of the people was not misplaced has been shown, as would have been anticipated by all who really know the sentiments of the poor, by universal experience; the accounts received from the inspectors concurring in the statement that the medical visitors were received with eagerness, and their aid accepted with gratitude. It is so essential that for the future there should be no misconception on this point, that some detailed evidence will not, it is conceived, be here misplaced.

The following important statement is taken from a letter addressed to Mr. Liddle from the four medical visitors of Clerkenwell:—

“In reply to the question as to the manner in which the system of house-visitation is received in this parish, we have great pleasure in observing that it is almost universally regarded as a great boon; that the visitors, on the object of their visit being perfectly understood, are everywhere received with expressions of gratitude and good feeling; that it substitutes a feeling of confidence for that of alarm, on the persons visited being assured that a disease, which they had been led to believe was always

sudden in its attack, fearfully rapid in its progress, and almost invariably fatal, is, on the contrary, in most cases preceded by a milder form of disorder quite under the control of medicine. Many who had been labouring under diarrhœa for some time were induced to use the necessary measures, and have recovered. The system, in fine, is regarded by the people as a great measure adopted to meet a great and special emergency; consequently those who are ordinarily averse to receive parochial or other gratuitous assistance, exhibit no reluctance in availing themselves of all the advantages of the system."

The following passage is also extracted from the Report of Mr. Liddle, and refers to the populous districts which he superintended:—

"At an early period of the epidemic, before the people were so generally aware of the importance of attending to the premonitory stage of the disease, neglect of diarrhœa was by no means of unfrequent occurrence; but so soon as the visitors enlightened the minds of the poor upon the subject these instances became more rare, and the prompt assistance which was afforded them in administering medicines upon the spot not only checked the disease in those who were suffering from the early stage, but inspired hope and confidence to all in the neighbourhood. The mere knowledge that medical aid could be immediately procured allayed alarm; and this conduced in no small degree to fortify the system against an attack. Several members in a family were attacked with cholera at the same time, so that it was impossible for any of them to go for medical assistance; and had it not been for the visitors discovering such cases, many would have perished without the consolation of having received any medical advice."

In another part of his Report Mr. Liddle adduces striking evidence to show that the poor are sensitively alive to the physical evils by which they are encompassed, that they are anxious to escape from them, and that they are grateful to those who interested themselves on their behalf. He says,—

"That a good moral effect was produced upon the minds of the people by the medical visitors was frequently manifested by the urgent desire expressed on the part of all, except the very lowest class of Irish, to remove the nuisances wherewith they were surrounded. The poor are now becoming more fully sensible of the physical evils which beset them, and earnestly desire to have them removed. 'They came out in crowds,' says a highly intelligent member of the Whitechapel Sanitary Committee, 'to thank those individuals who were interesting themselves in removing the abominations which abounded in nearly all the localities inhabited by them.'"

The experience of the gentlemen engaged as medical visitors in the parish of Islington, seven in number, has been already quoted.

Mr. *Kay*, one of the visitors of St. Luke's parish, says,—

"The poor are fully satisfied, and seem always willing to listen to any suggestion tending to improve their sanitary condition; they are also most grateful, and are anxious to assist by giving all the necessary information in order to carry out fully the visiting system."

One of the visitors, Mr. *R. Molloy*, says,—

"I have visited hundreds of houses and conversed with thousands of the poorest class, and I have never heard one dissentient from the general opinion; namely, that the system of visitation was received by them with feelings

of gratitude and thankfulness, not unmixed with surprise at the Legislature having thought of them at last: this is their own expression."

Dr. *Gavin*, in his Report, thus expresses himself:—

"In endeavouring to express the general sentiments of the recipients of medical aid during the house visitation, it is difficult to convey, in other terms than the simple, unaffected language of the poor, their deep, heart-felt gratitude for the interest thus manifested towards them.

"In some places the gratitude of the poor is stated by the visitors as having been unbounded. Mr. Sutton, one of the medical visitors, says,—'I candidly say, a more grateful body of people, as I discovered them, could not be found.' Mr. Ayling says,—'I was greeted with benediction and hailed with gratitude.' Mr. Webb, after stating that the gratitude of the poor exceeded his expectation, says, 'I mention one circumstance worthy of record: while visiting Long-alley a man in liquor accosted me with—'Give us a good dinner, and we shall have no cholera;' and, following up this remark with insult, I had some difficulty in preventing a mob, which soon collected, from severely chastising him for his conduct.' Dr. Baylis says, 'One and all have been exceedingly grateful.' Dr. Mogg states they were on all occasions exceedingly grateful; to use their own words—'they are thankful for being looked after.' Mr. Barnett remarks,—'Never was an assertion so wide of the truth as that the poor are ungrateful; the poor in my district were in the utmost degree thankful.' Mr. Ferguson says,—'They have looked upon our staff as messengers of mercy, and welcomed us with many kind outpourings of grateful hearts; they felt that, though hitherto uncared for in their dire and dreadful calamity, at last the Board of Health had come forward as beneficent guardians of their health, and quieted alarm by efficient preventive measures.' Mr. Tuxford observes,—'The poor look upon the medical visitation with the greatest affection; we are sought after and loaded with blessings; and the poor only lament that we were not appointed before, and that they are so soon to lose us.' Mr. Brown remarks, 'I have often been addressed with expressions of joy during my progress through the courts and alleys in which the poor reside, upon the prospect of amelioration in their wretched condition.'"

Dr. *Lewis* reports as follows of the feelings of the poor in the parishes and unions under his charge:—

"The medical house visitation was received with the greatest thankfulness. In the overcrowded districts the poor eagerly told the visitors their complaints, and received the medicines most gratefully. The instructions and advice were anxiously obeyed, and the visits were looked for in future. The people told me in several cases that they believed their lives were saved by being called upon by a medical man, while suffering from the weakness consequent upon the premonitory symptoms, instead of having to go to the surgeon, and finding then that he was attending another case. Two or three instances occurred within my own knowledge, of proposals being made by the poor for the purpose of presenting the visitors with some small testimonial, to mark their thankfulness for the benefits derived from their having been visited and comforted during a period of great affliction."

Dr. *Lewis* also points out another great advantage attendant on the system. He says,—

"Close observation and inquiry convinced me that a great moral effect was created in the districts where the system was well carried out. As soon as it was known that a staff of properly educated men were employed for the sole purpose of attending to the epidemic by the order of Government, a large degree of the terror which had seized on people's minds left them."

Mr. *Walsh*, who superintended several unions on the south of the river, says,—

“The feeling of cordial kindness with which the medical visitors were received by the poor, and the people generally, was a gratifying proof that they appreciated the benefit of their visits. The medical officers too were generally very highly spoken of.”

The only qualification it is requisite to make in the preceding statements is, that in some very limited and exceptional cases the visitors were rudely received; but it is proper to remark that this happened almost exclusively among the class above the poor, which therefore did not contain those for whose special benefit the plan was designed.

Dr. *Gavin* thus sums up the feelings inspired among the poor by the system of house visitation:—

“It seems to have given them a new confidence in the spirit of the institutions of their country, and to have inspired a feeling of regard for those above them which was quite unknown before. From my own personal inquiries I am satisfied it has done more to establish a bond of union in feeling between the neglected poor and the classes above them, than could have been aroused in any other way, or by any other means.”

It cannot be a matter of surprise that, when the results of the effectual medical aid thus afforded were brought so strikingly before the eyes of the people, deep regret should have been expressed in all parts of the metropolis that the preventive system had not been earlier adopted. Dr. M'Loughlin reports that in Stepney the poor, seeing in a very brief period that the progress of the disease was arrested by the medical visitation, exclaimed, partly in reproach and partly in sorrow, “Ah! if this had been done sooner our relatives, who are now in their graves, would have been alive.”†

Mr. Liddle, who had charge of St. Luke's parish, in his Report quotes the evidence of Mr. Snell, one of the medical visitors, who says,—

“He finds it an almost universal regret that the system of house visitation had not been recommended earlier, as many believe ‘that would have saved the life of a departed relative.’”

Another gentleman, Mr. *Webb*, who acted under Dr. Gavin, says,—

“When one of a family has been relieved it is no uncommon observation amongst them—‘You are come too late; had you come before, my husband, wife, or child, would now be alive.’”

Dr. *Lewis* observes,—

“It was a remark by no means unfrequently made by persons who had lost relatives at the commencement of the epidemic, that, if the house-to-house visitation had commenced earlier, their friends might have been saved.”

The few examples last adduced must suffice to indicate the existence of a wide-spread and most natural feeling which, the sentiments of every individual will readily suggest, must have constituted probably the bitterest element of that cup of misery, which so many thousands of mourners drained during the late destructive epidemic.

Review of House Visitation.—In considering the various circumstances detailed in the preceding pages, the main and leading fact to be deduced from them is the extraordinary efficiency of house visitation in

controlling the ravages of epidemic cholera. Whatever difference of opinion may arise as to the precise amount of this preventive influence, one thing is beyond dispute, namely, that, as compared with all other modes of managing this terrific disease, medical visitation is incomparably the most successful. In all parts of London practitioners and medical officers became converts on observing the results; every individual who was engaged in carrying out the plan, whether as inspector or visitor, whatever may have been his previous opinions, has given his unqualified approval of the system. In various parts of the country the plan has been adopted, and everywhere the physicians and surgeons engaged in it have expressed their conviction of its entire efficiency. But if all other testimony were wanting, there is one which is of a nature that can be touched neither by friend nor foe; it is the witness of hundreds, perhaps we ought to say thousands, of the poor in every part of this metropolis, who have found in their own unlooked-for safety the proof that a remedy had been for them provided, for the want of which their relatives and friends had perished.

Results of this important character would, under any circumstances, be sufficient to stamp this system as the one effective method; but it must not be forgotten that it was not put into operation until great efforts had been made, by the provision of extra medical aid, by the admirable devotion of the ordinary medical staff of the several unions and parishes, by placards and other means, to secure early and effectual aid to the suffering poor. A plan which, after such exertions as these had been in operation for several months, was so much more successful as to attract the general attention, and secure the approbation of all who witnessed its operation, must have had within itself a principle of great excellence. There are, however, other considerations which suggest themselves in connexion with the house visitation. This great measure is the first general effort that has yet been made in the metropolis to investigate and rectify, by the direct agency of medical men, the sanitary evils afflicting the poor; and from the improvement which, in every instance, is reported by the visitors to have followed even the partial application of the appropriate means, some idea may be formed of the advantages and comfort which would be secured to the labouring population from their universal adoption.

The house-visitation has placed in a strong light the many evils connected with the existing mode of medical relief to the poor. There is a remarkable agreement in the statements of the visitors employed in different quarters of the metropolis as to the deep aversion existing among the labouring classes in regard to their acceptance of parochial medical aid, and the consequent mischief thence arising. The delay and impediments in the way of obtaining the necessary order, and the subsequent advice and medicine; the loss of wages; the distaste for pauper relief;—these are so many obstacles intervening between the actual existence of disease and the treatment it demands. And yet there is nothing more to be deprecated than such delay. Trifling complaints by neglect become serious; acute affections become chronic; whilst maladies perfectly curable in their incipient stage take such hold on the system, that they either bring their victims to a premature grave, or disable them from all profitable labour by months or years of sickness. It might be thought that what was wanting in the parochial system in

this respect would be supplied by hospitals and dispensaries; but, vast as are the benefits bestowed by these institutions, they only very partially meet the evil in question.

To those who are unacquainted with our town populations, the large pecuniary sacrifice thus caused is but little comprehended; and yet, if to the neglect of the early assaults of disease be added the amount of sickness induced directly by removable causes, it may be safely asserted that, of all the sources of pauperism, these two are the most prolific. Even to those directly engaged in administering the parochial funds, the true cause of so much of the outlay they wish to escape is often unsuspected; or, if placed before them, repudiated.

It is the opinion of all who have been engaged in carrying into operation the preventive measures of the Board of Health, that great benefit would accrue, both to the community and to the poor, from any plan which would secure to the labouring classes prompt and acceptable medical aid in every form of sickness.

I cannot conclude this section of the present Report without offering my humble tribute of respect to what, among so many painful circumstances, is so gratifying as to the past, and so full of promise for the future—the admirable conduct of the people under the awful calamity with which it pleased Almighty God to visit this metropolis. In the midst of an amount of physical misery which no language can depict, and exposed to the ravages of a pestilence which within the limits of Europe, nay, within these kingdoms, have in this last epidemic created in the popular mind dark suspicions of the higher classes of society, and specially of those who know no other mission but to mitigate the bodily sufferings of mankind, the industrious poor of London have submissively borne their trials—so submissively, indeed, that no voice of complaint reached the public ear; though it is proved, by the unanimous testimony of a large body of medical men, that our humbler fellow-citizens are as acutely sensible to the manifold evils by which, in the filthy courts and alleys of the metropolis, their health is undermined, and their lives are sacrificed, as they are ready to tender their gratitude for any well-directed efforts designed for their relief.

CONCLUSION.

HAVING day after day, and for months in succession, been a witness of the great evils springing from the neglected sanitary condition of the metropolis, I have felt no choice was left me but to place on record the more important facts respecting it which have been brought before my notice; and as I have repeatedly observed that the authorities of one district, whilst admitting that in other places there might be neglect, affirmed that their parish required little or no amendment, it further seemed to be necessary, even at the risk of appearing prolix, to adduce illustrations from all parts of the metropolis. It is, indeed, one of the great difficulties those who are anxious to ameliorate the condition of the poor experience, that a large part of the influential classes of society know personally so little of the localities and dwellings

occupied by them. Many instances have occurred, during the late inquiries, in which, even in country towns, individuals among the higher classes, having been induced to visit the more destitute districts, have expressed their surprise that a condition so miserable as that in which they found their poorer neighbours could have a real existence. I have myself never conversed with any one well acquainted with the subject who was not profoundly impressed with the evils connected with it. The members of the medical profession, in the presence of these physical evils, when they are, as so often happens, concentrated, find their science all but powerless; the minister of religion turns from these densely crowded and foul localities almost without hope; whilst the administrators of the law, especially the chaplains and governors of prisons, see that crime of every complexion is most rife where material degradation is most profound. In an important document lately published, containing the Reports of the governors and chaplains of the Houses of Correction at Coldbath-fields and Westminster, it is stated, as the result of the experience of these most competent judges, that, among the causes of crime, the miserable condition of the dwellings of the labouring classes holds a prominent place. The following paragraph from the Report of G. L. Chesterton, Esq., places this in a strong point of view:—

“The crowning cause of crime in the metropolis is, however, in my opinion, to be found in the shocking state of the habitations of the poor, their confined and foetid localities, and the consequent necessity for consigning children to the streets for requisite air and exercise. These causes combine to produce a state of frightful demoralization. The absence of cleanliness, of decency, and of all decorum—the disregard of any heedful separation of the sexes—the polluting language and the scenes of profligacy hourly occurring,—all tend to foster idleness and vicious abandonment.” “Here I beg emphatically to record my conviction, that this constitutes the *monster mischief*.”

If, to considerations like these, regarding the moral and religious aspect of this great question, be added those suggested by the indescribable physical sufferings inflicted on the labouring classes by the existing state of the public health in the metropolis, the conviction must of necessity follow, that the time is come when efforts in some degree commensurate with these great and pervading evils can no longer with safety be deferred. Although the higher and middle ranks of society experience a comparative immunity from the ravages of epidemics, an exemption in itself suggestive of some great offering of gratitude to the Giver of all good gifts, it is yet well known that, when these diseases attain to a certain intensity, they break through their ordinary barriers, and, as happened a few years ago at Liverpool, the most unhealthy city in England, spread death and alarm among even the highest classes. It cannot, therefore, be aught else than an anxious consideration to all ranks that in 1848, independently of the cholera, the mortality from zymotic diseases in the metropolis was, by several thousands, higher than it had ever been before, namely 18,113; that it exceeded the whole mortality from cholera in the last epidemic by 3523; that it was double the mortality from zymotic disease in 1845; and approached to three times that of 1842. If, turning from this, the lowest, because the selfish view of the question, to the fact that thousands of the poor are compelled, owing to the scarcity of one prime necessary of life, to use for domestic purposes, nay, even to drink, water

drawn from ditches and wells polluted with the foetid overflowings of cesspools, a motive for the exertions and self-sacrifices of philanthropy is indicated, which, in a metropolis pre-eminently distinguished for its sympathies with suffering in all its forms, requires, to insure its adoption, only to be known. But there yet remains for the highest of all reflections, that of the Christian, the fact that, owing to the concentration of all these physical ills, the great majority of which, it must never be forgotten, are susceptible of removal, the span of existence allotted in mercy for the preparation for another world is fearfully curtailed in all the densely populated districts of London, the climax being attained in one spot, where the value of human life is cut down to the brief space of eleven years and a half.

In concluding this Report, I beg to state that I have obtained a large amount of information from the valuable reports of the Medical Inspectors appointed by the General Board to superintend the system of house visitation in London, and especially from those of Dr. Gavin, Dr. Waller Lewis, Dr. Macloughlin, Mr. Liddle, and Mr. Walsh. I also feel it to be an act of duty to these gentlemen to state, that during the time they were thus engaged they most zealously devoted themselves to the discharge of the important duties with which they were intrusted; and to the very able manner in which those duties were performed, seconded by the great exertions of the Medical Visitors, I attribute a large part of the success that resulted from the application of the preventive measures directed by the General Board; measures which, under the Divine blessing, were the means of saving a large amount of human life. Some extracts will be found from the interesting reports of Dr. Milroy, on certain parts of the metropolis. To Mr. H. C. Edwards I am indebted for the preparation of several statistical tables, and for other assistance.

I have the honour to be,

My Lords and Gentlemen,

Your most obedient servant,

R. D. GRAINGER.

June 10, 1850.

APPENDIX.

CONTENTS.

- No. 1.—Return of Deaths from Cholera in the 60 weeks ending November 24, 1849.
- No. 2.—Analysis of Deaths from Cholera in the Metropolis during the 60 weeks ending November 24, 1849.
- No. 3.—Analysis of Deaths from Cholera in the Metropolis during the 60 weeks ending November 24, 1849.—Males and Females.
- No. 4.—Dr. Guy's Abstract of the Professions and Occupations of 4312 Males, of the age of 15 years and upwards, who died of Cholera in London during the epidemic of 1848-9, with a rough approximation to the ratio which the deaths bear to the living.
- No. 5.—Dr. Waller Lewis' Report on Investigation into alleged cases of Contagion from washing Cholera Clothes.
- No. 6.—Copy of a Letter from the Rev. Charles Marshall, Vicar of St. Bride.
- No. 7.—Directions and Regulations issued by General Board of Health to Poor Law Guardians and others.
- No. 8.—Extract from the Evidence of J. Hodgson, Esq., on Dr. McCann's Plan.
- No. 9.—Instructions as to the Duties of the Medical Superintendents and Visitors of the Metropolitan Districts, in carrying out the Preventive Measures of the General Board of Health.
- No. 10.—Specimen of Dr. Gavin's Daily Return of Choleraic Disease in each Parish.
- No. 11.—Return of Choleraic Disease in the Parish of Bethnal-green, in the practice of the Parochial Medical Officers, and discovered by the Visitors during Visitation.
- No. 12.—Mr. Liddle's Table of the Progress of Cholera, &c., in the Parishes of St. Luke, Islington, and Clerkenwell, and in the Whitechapel Union.
- No. 13.—Copy of a Letter from the Rev. W. Weldon Champneys, Rector of Whitechapel.

No. 4.—*Dr. Guy's Table*.—In the Report of the Registrar-General for the week ending December 22, 1849, Dr. Guy has given a very interesting account of the professions or occupations of 4312 men of the age of 15 and upwards, who were destroyed by cholera, the ratio to the living being also calculated as accurately as the data available for that purpose would permit.

ABSTRACT of the PROFESSIONS and OCCUPATIONS of 4312 MALES, of the Age of 15 Years and upwards, who died of CHOLERA in London, during the Epidemic of 1848-9. By W. A. GUY, Esq., M.D., Professor of Forensic Medicine, King's College, and Physician to King's College Hospital. Together with a Rough Approximation to the ratio which the Deaths bear to the Living. This ratio is obtained, in the case of tradesmen, by dividing the number following each trade (as given in the Post Office Directory for 1840) by the number of deaths; and in the case of all the other classes, by dividing the number of the living in each class, as returned by the Census of 1841, by the number of deaths. In the case of such of the working-class as follow occupations of the same name with that borne by tradesmen, the number of the living is obtained by subtracting the number of tradesmen from the total given in the Census, such total comprising both the employers and the employed. The table comprises the inmates of workhouses, hospitals, and asylums, who were returned as having definite occupations.

	Number of Deaths.	Ratio.
Gentlemen, and Men of Independent Means	135	1 in 200
Clergymen of the Church of England (3), and Ministers of other Persuasions (3)	6	1 in 213
Physicians, Surgeons, and General Practitioners	16	1 in 265
Magistrates, Barristers, Conveyancers, and Attorneys	13	1 in 375
Learned Professions	— 35	1 in 297
Architects, Civil Engineers, and Surveyors	11	1 in 115
Actuaries, Accountants, Bill and Share Brokers, Editors,) Reporters, &c.	14	1 in 118
Merchants	11	1 in 348
Officers in the Army and Navy	11	..
Other Professions	8	..
TRADESMEN (Masters), &c.		
Agents	12	1 in 49
Auctioneers	1	1 in 266
Bakers	8	1 in 133
Blacksmiths, Whitesmiths, Locksmiths, &c.	2	1 in 65
Brewers	1	1 in 160
Bricklayers and Builders	14	1 in 39
Bookbinders, Booksellers, Stationers, Printsellers, &c.	14	1 in 96
Brokers	6	1 in 170
Butchers	8	1 in 123
Cab and Omnibus Proprietors	5	..
Cabinet-makers, Carpenters, Upholsterers, Undertakers, &c.	14	1 in 110
Cheesemongers	13	1 in 51
Chemists and Druggists	7	1 in 86
Chimney-sweeps	2	..
China, Glass, and Earthenware Dealers	5	1 in 51
Clerks, Accountants, &c.	100	..
Coffee-shop Keepers	3	1 in 85
Carried forward	440	

Abstract of the Professions and Occupations of 4312 Males, of the Age of 15 Years and upwards, who died of Cholera in London, during the Epidemic of 1848-9—*continued.*

	Number of Deaths.	Ratio.
Brought forward	440	
Coalmerchants	6	1 in 85
Cornchaplans	5	1 in 85
Cowkeepers, Dairy-men, Milkmen	8	1 in 20
Customhouse Officers	11	..
Drapers, Hosiers, Haberdashers, &c.	17	1 in 71
Dyers	2	1 in 112
Eating-house Keepers	3	1 in 36
Egg Merchants	5	1 in 6
Excise Officers	7	..
Farmers	8	..
Fishmongers	11	1 in 20
Foremen	12	..
Fruiters and Greengrocers	12	1 in 28
Gardeners	4	..
General Dealers	32	..
Grocers	20	1 in 65
Hatters and Furriers	3	1 in 143
Ironmongers	7	1 in 53
Jobmasters, Livery-stable Keepers	5	1 in 37
Master Mariners	25	..
Musicians	4	..
Oilmen	13	1 in 46
Painters and Glaziers	3	1 in 142
Papermakers	2	1 in 15
Pastrycooks	2	1 in 127
Pawnbrokers	4	1 in 64
Printers	4	..
Poulterers	3	1 in 32
Publicans, Licensed Victuallers, Beer-sellers	42	1 in 63
Saddler	1	1 in 250
Sailmakers	2	1 in 30
Salesmen	7	..
Schoolmasters	7	..
Shoemakers	8	1 in 120
Tailors	6	1 in 233
Travellers	19	..
Tobacconists	6	1 in 75
Turners	2	1 in 50
Wharfingers	2	1 in 55
Wheelwrights	1	1 in 80
Wine Merchants	5	1 in 170
Other Trades	34	..
ARTIZANS AND LABOURERS.		
Artists, Print-colourers, &c.	8	..
Bakers	52	1 in 148
Ballast-heavers	7	1 in 24
Bargemen	18	1 in 126
Bar-men, Potmen, Potboys	8	..
Basket-makers	7	1 in 96
Carried forward	920	

Abstract of the Professions and Occupations of 4312 Males, of the Age of 15 Years and upwards, who died of Cholera in London, during the Epidemic of 1848-9—*continued.*

	Number of Deaths.	Ratio.
Brought forward	920	
Beadles	5	..
Beggars, Tramps, &c.	6	..
Bricklayers	47	1 in 143
Brickmakers	12	1 in 67
Brass-finishers	3	1 in 318
Boat-builders	3	1 in 166
Bookbinders	18	1 in 150
Brushmakers	11	1 in 153
Butchers	32	1 in 174
Cabinet-makers and Upholsterers	70	1 in 89
Cabmen	35	..
Carmen, Carriers, and Carters	52	1 in 74
Carpenters and Joiners	111	1 in 155
Carvers and Gilders	9	1 in 219
Chimney-sweeps	7	..
,, (Masters and Men)	9	1 in 109
Cigar-makers	4	..
Coachmen and Cabmen	57	1 in 95
Coachmakers	16	1 in 262
Coalporters and Coalheavers	53	1 in 32
Compositors	21	..
Cooks and Confectioners	11	1 in 106
Convicts	36	..
Coopers	28	1 in 124
Corkcutters	2	1 in 279
Curriers and Leather-dressers	24	1 in 95
Cutlers	6	1 in 106
Comb-makers	3	1 in 148
Dock-labourers	10	..
Draymen	13	..
Drovers	6	1 in 54
Dustmen and Scavengers	6	1 in 39
Dyers	7	1 in 230
Engineers	44	1 in 94
Engravers	9	1 in 199
Farriers	12	1 in 106
Firemen	2	1 in 80
Fishermen	6	1 in 93
Footmen and Men-servants	25	1 in 1572
Founders	10	1 in 12
French Polishers	6	1 in 157
Furriers	6	1 in 116
Gardeners	48	1 in 93
Gas-fitters	8	1 in 54
Glass-workers, Glass-cutters, &c.	8	1 in 126
Glass-blowers	3	..
Glove-makers	3	1 in 98
Grooms and Ostlers	37	1 in 75
Gun-makers	7	1 in 143
Hairdressers	13	1 in 154
Hatters	26	1 in 92
Carried forward	1,926	

Abstract of the Professions and Occupations of 4312 Males, of the Age of 15 Years and upwards, who died of Cholera in London, during the Epidemic of 1848-9—*continued.*

	Number of Deaths.	Ratio.
Brought forward	1,926	
Hawkers, &c.	67	1 in 22
Japanners	2	1 in 187
Jewellers, Goldsmiths, and Silversmiths	6	1 in 583
Labourers	756	1 in 65
Lamplighters	6	..
Last-makers	2	1 in 80
Letter-carriers and Postmen	6	..
Lightermen	20	1 in 75
Lithographers	3	1 in 48
Locksmiths and Bellhangers	3	1 in 117
Masons	17	1 in 204
Matmaker	1	1 in 192
Mathematical Instrument Makers	2	1 in 120
Messengers, Porters, and Errand-boys	99	1 in 131
Milkmen and Cowkeepers	14	1 in 143
Modellers	3	1 in 41
Musicians	6	..
Millwrights	2	1 in 266
Packers	2	1 in 151
Painters, Plumbers, and Glaziers	73	1 in 144
Paper-makers and Stainers	8	1 in 136
Plasterers	20	1 in 129
Pensioners	64	..
Policemen	24	1 in 208
Polishers	4	1 in 36
Potters	6	1 in 52
Printers (including Compositors)	61	1 in 105
Rag-sorters	2	1 in 54
Railway Guards	10	..
Rope-makers, Cord and Twine Spinners, &c.	12	1 in 88
Sailors (including Greenwich Pensioners)	299	1 in 24
Saddlers, Harness and Whip makers	15	1 in 133
Sawyers	33	1 in 90
Scalemakers	2	1 in 60
Shipwrights	20	1 in 105
Silk-dressers	2	..
Shoemakers	151	1 in 162
Shopmen	35	..
Smiths	62	1 in 105
Soldiers	62	..
Stokers	13	..
Sugar-bakers	4	1 in 152
Tailors	80	1 in 244
Tanners	22	1 in 39
Tallowchandlers	2	1 in 430
Tin-plate Workers	7	1 in 178
Tobacco-pipe Makers	6	1 in 75
Toll-collectors	3	1 in 56
Toymakers	4	1 in 76
Turners	18	1 in 83
Type-founders	1	1 in 390
Carried forward	4,068	

Abstract of the Professions and Occupations of 4312 Males, of the Age of 15 Years and upwards, who died of Cholera in London, during the Epidemic of 1848-9—*continued.*

	Number of Deaths.	Ratio.
Brought forward	4,068	
Umbrella-makers	3	1 in 176
Undertakers	2	1 in 325
Waiters	14	..
Watchmen	7	..
Watermen	27	1 in 61
„ (Cabstands)	2	..
Warehousemen	8	1 in 472
Watchmakers	11	1 in 364
Weavers	102	1 in 36
Wheelwrights	8	1 in 294
Window-blind Makers	3	1 in 82
Wine-coopers	3	1 in 171
Wharfingers	2	1 in 85
Wire-drawers	3	1 in 61
Woolsorters	4	..
Other Occupations	75	..
	4,342	
Subtract as entered twice	30	
	4,312	

No attempt is made to correct for increase or decrease of population since 1841; and the persons of the several occupations returned in the metropolis by the Census Commissioners do not include those of Wandsworth, Hampstead, or Lewisham.

No. 5.—*Dr. Waller Lewis' Report on Investigation into alleged cases of Contagion from washing Cholera Clothes.*

MY LORDS AND GENTLEMEN,

Nov. 29th, 1849.

In compliance with instructions that I received from Dr. Southwood Smith, to investigate those cases of cholera that were alleged to have been caused by contagion from washing the clothes of cholera patients, I have had the honour of laying before you at different periods, as I could procure the evidence and information of the parties concerned, the particulars of every case registered in the weekly returns of the Registrar-General, during the late epidemic, as well as of some other cases that have come to my knowledge in other ways.

Many circumstances caused the requisite evidence to be procured with the greatest difficulty. The death of the women who had washed the clothes, and the universal absence of notes by the medical attendants, caused by the entire absorption of their time in actual attendance on the sick, were among the principal of these.

I have, however, had personal interviews, or have corresponded on the subject, with all these gentlemen, as well as with the various district registrars, and the friends and relatives of the deceased, and have by these means procured a large amount of trustworthy evidence on—

1st. The previous state of health of the patient.

2nd. Her habits.

3rd. The sanitary condition of her abode.

4th. Her diet about the date of her being taken ill.

5th. The presence or absence of premonitory symptoms *before* washing the clothes.

As well as on other subjects pertinent to the case.

The results of this investigation are, that in my opinion *not a single case can be proved to be owing to contagion*. In every instance there were numerous other causes for the disease manifesting itself in the patient, independently of washing the clothes. It should be borne in mind also, that laundresses appear to have fallen victims to this epidemic in a larger proportion than women of almost any other employment whatever, and this without a tittle of evidence being adduced of their having washed the clothes of cholera patients. In the course of the ten weeks ending 6th October, 50 washerwomen died of this complaint in the metropolis alone.

Having already laid before your Honourable Board the particulars of each of the following cases *in extenso*, I will now merely recapitulate the principal points which my investigations have brought to light, and which I think will satisfy any one that, under the circumstances, the attack can be at least as well assigned to other causes as to the alleged one. In one case I ascertained that the deceased did not wash the infected clothes, while the person who did escaped. In three others, at least, the disease manifested itself *before* the linen was washed. In nearly every instance the condition of the house and the street or court inhabited by the patient was of the most dangerous description.

Case 1. Fol. 53.—S. M., Kensington.

Very intemperate and irregular; locality most unhealthy; open sewer in front. Another person who did not wash clothes died in same house.

Case 2. Fol. 56.—Mrs. C., Parson's Green-lane, Fulham.

Very intemperate, and underclothed and fed; locality the worst in the parish. 13 others died of cholera in the lane. Great accumulations of dirt and filth in the house. Water very unwholesome.

Case 3. Fol. 55.—M. C., Brompton.

Scrofulous habit. Premonitory symptoms certainly present *while washing*, and most likely *before*. Ate tainted pork for supper the night before attack.

Case 4. Fol. 63.—M. S., Brompton.

Had purging and vomiting the day *previous* to washing.

Case 5. Fol. 69.—A. A., Kensington-town.

Before she washed the clothes, took an ounce of Epsom salts, which caused hypercatharsis; but she neglected this, not checking it; and cholera soon ensued.

Case 6. Fol. 43.—C. S., Clerkenwell.

Sanitary condition of Peartree-court "as bad as possible;" close to Fleet-ditch. Untrapped gullies, very narrow and low. Privies overfull and adjoining entrance of house. Ate a large supper of boiled salt pork, greens, and potatoes, the night before the attack.

Case 7. Fol. 53.—M. B., Wandsworth.

Had no symptom of illness till 3 or 4 days after washing the clothes. House small and dirty. Horrible privy adjoining room where she slept: fluids had oozed through the wall into the room; stench consequently intolerable. Much cholera and diarrhœa all round.

Case 8. Fol. 30.—M. R., St. James's workhouse.

Very destitute and poor. Very intemperate. Premonitory symptoms present *before* washing clothes.

The two following cases are not in the returns of the Registrar-General:—

Case 9. Fol. 60.—A. M., Mount-street workhouse.

Very intemperate. Constantly drunk. *Night-nurse* for two years pre-

viously. Deprived of sleep about time of attack. Constitution much impaired. Ate $1\frac{1}{2}$ lbs. of stale suet workhouse pudding boiled up a second time (after having been kept for 3 days or more in a closet in the cholera ward) the day before the attack.

Case 10. Fol. 37.—Notting-hill.

Evidence proved that *she* did not wash any of the cholera clothes, but that the woman who did wash them did not suffer from the disease.

Hoping that the facts I have deduced relative to these cases may prove satisfactory to your Honourable Board, I have the honour of remaining,

My Lords and Gentlemen,

Your obedient servant,

WALLER LEWIS, M.B. Cantab.,

20, Edwards-street, Portman-square.

To the General Board of Health.

No. 6.—*Copy of a Letter from the Rev. Charles Marshall, Vicar of St. Bride.*

9, South-street, Finsbury,
10th April, 1850.

MY DEAR SIR,

In reply to your inquiries respecting the medical assistance which I was enabled to obtain during the prevalence of cholera in my parish of St. Bride, I have to inform you, that early in July, the cholera having begun to rage with great violence, I took all the means in my power to ascertain the most probable method of success in staying its ravages.

The result of my investigations was that nothing but daily house-to-house visitation was likely to be effectual for this purpose.

I immediately requested the Board of Guardians of the West London Union to grant, agreeably to the wish of the authorities of the parish, such medical assistance as would be sufficient for the visiting required.

The guardians, however, could not be prevailed upon to regard the plan as either necessary or desirable; which may in part be accounted for by the fact of the guardians representing some parts of the union being insensible of the necessity, through the localities and parishes represented by them not being at all attacked, or not nearly with such severity as St. Bride's, where it was raging most alarmingly.

In the mean time the burial-grounds of the parish had been closed, and all done that the parochial authorities could do for the health of the parish.

The Board of Health, learning the distressing state of things in St. Bride's, ordered the guardians to appoint 6 additional medical officers: on which the union appointed 3; afterwards others were appointed in addition. But it was not till after a month or six weeks' delay that the system of house-to-house daily visitation was commenced; which was conducted for a few days, partly by the medical gentlemen appointed by the Board, and partly by additional medical gentlemen obtained by me from the Committee of Health of the City of London.

No sooner had the system been in operation for a day or two than the most important improvement took place in the health of the parish; and in a very short time the pestilence was arrested.

I do not mean to impute any want of readiness on the part of the guardians to do what appeared to them right; but I mention these facts, at your request, to show that hundreds of lives may be lost before you can convince a Board of Guardians what is best to be done. In such cases as cholera, promptitude in action is everything. My own experience has proved this again and again.

Yours faithfully,

CHARLES MARSHALL,

Vicar of St. Bride.

R. D. Grainger, Esq.

No. 7.

To the guardians of the poor of the several unions named in the schedules hereunto annexed;

To the councils and other governing bodies of cities and boroughs, commissioners under local Acts, the surveyors of highways, their deputies and assistants, the trustees, county surveyors, and others by law intrusted with the care and management of the streets and public ways and places within the said unions;

To the owners and occupiers of houses, dwellings, churches, buildings, and places of assembly within the said unions, and others having the care and ordering thereof;

And to all whom it may concern.

WHEREAS by the provisions of the "Nuisances Removal and Diseases Prevention Act," 1848, for the prevention of epidemic, endemic, and contagious diseases, and by virtue of an order of the Lords of Her Majesty's most Honourable Privy Council, bearing date the 28th day of September, 1848, directing that the said provisions of the said Act be put in force throughout the whole of Great Britain, we the General Board of Health are authorized to issue such directions and regulations as the said Board shall think fit for the prevention (as far as possible) or mitigation of epidemic, endemic, or contagious diseases; and whereas by the said Act it is provided that the directions and regulations to be issued as aforesaid shall extend to all parts or places in which the said provisions of the said Act shall for the time being be in force, under the order of Her Majesty's Privy Council, unless such directions or regulations shall be expressly confined to some of such parts or places, and then to such parts or places as in such directions and regulations shall be specified:

Now, in exercise of the authority vested in us aforesaid, we the General Board of Health do issue the directions and regulations hereinafter contained, to extend to all parts and places within the several unions named in the schedules hereunto annexed, and to all extra-parochial places adjoining to such unions, viz:—

I. We direct that all councils and other governing bodies of cities and boroughs, commissioners under local Acts, surveyors, and district or assistant surveyors of highways, trustees, county surveyors and others by law intrusted with the care and management of the streets and public ways and places within the parts or places to which these directions and regulations extend, shall once at least in every twenty-four hours effectually cleanse all such of the streets, rows, lanes, mews, courts, alleys, and passages, and public ways and places under their respective care and management, as by the medical officer of the guardians, or others authorized to superintend the execution of this direction and regulation, shall be certified in writing to be in a state dangerous to health, or to require frequent and effectual cleansing by way of precaution against disease; and shall remove all filth, ordure, and nuisances therefrom.

II. And where any such streets, rows, lanes, mews, courts, alleys, and any passages, public ways or places, to which any houses or tenements adjoin, which have not been intrusted by law to the care or management of any council, commissioners, surveyors, trustees, or others, have been certified in writing, by such medical officer as aforesaid, to be in a state dangerous to health, or to require such frequent and effectual cleansing, we direct that every occupier of a house or tenement so adjoining shall keep or cause to be kept sufficiently cleansed, at least once in every twenty-four hours, such part of the street, row, lane, mews, court, alley, or passage, way or place, as adjoins the house or tenement occupied by him.

And we direct that all such works of cleansing, and removal of filth, ordure, and nuisances, as are required by these directions and regulations, shall be done

in such manner by effectual washing or otherwise, and with the use of such fluids or substances for preventing the escape of noxious effluvia during the operation, as the medical officer of the guardians or others authorized to superintend the execution of these directions and regulations shall think necessary and shall direct.

III. We do hereby authorize and require the said guardians, by themselves or by their officers or persons employed under them in the administration of the laws for the relief of the poor, or by officers or persons specially appointed in this behalf, to superintend and see to the execution of the foregoing directions and regulations within their respective unions, and in any extra-parochial places adjoining thereto respectively.

IV. And further, where it shall appear that by want or neglect of the council of any city or borough, commissioners, surveyors, trustees, or others intrusted with the care and management as aforesaid, or by reason of poverty of the occupiers or otherwise, there may be any default or delay in the cleansing of or removing nuisances from any street, row, lane, mews, court, alley, passage, or public way or place certified as aforesaid, within any of the said unions, or any extra-parochial place adjoining thereto, we authorize and require the guardians of such union to cause such street, row, lane, mews, court, alley, passage, way, or place to be effectually cleansed, and all nuisances to be removed therefrom, and to do all acts, matters, and things necessary for that purpose.

V. We also direct as follows:—

That,

When and so often as any dwelling-house in any part or place to which these directions and regulations extend, is in such a filthy and unwholesome condition as to be a nuisance to or injurious to the health of any person; or

Where upon any premises, or any part or place as aforesaid, there is any foul and offensive drain, ditch, gutter, privy, cesspool, or ashpit, or any drain, ditch, gutter, privy, cesspool, or ashpit kept or constructed so as to be a nuisance to or injurious to the health of any person; or

Where upon any such premises swine or any accumulation of dung, manure, offal, filth, refuse, or other matter or thing is kept, so as to be a nuisance to or injurious to the health of any person; or

Where upon any such premises (being a building used wholly or in part as a dwelling-house), or being premises underneath any such building, any animal is kept, so as to be a nuisance or injurious to the health of any person;

In each of the above-recited cases, the owner or occupier, and persons having the care or ordering of such dwelling-house, or of the premises where the nuisance or matter injurious to health may be, shall cleanse, whitewash, or otherwise purify as the case may require, such dwelling-house or building; or abate or remove the nuisance or matter injurious to health as aforesaid, with all reasonable speed after the publication of these our directions and regulations, or after the nuisance or matter injurious to health shall have arisen.

VI. In case, by reason of poverty or otherwise, the occupier of any such dwelling-house or premises is unable to perform any works required by these directions or regulations, such occupier shall give notice of such his inability to the guardians of the union comprising the place wherein the premises shall be situated.

VII. We authorize and require the guardians aforesaid, by themselves or by officers by them authorized in this behalf,

To see to the execution of the directions hereinbefore contained for the cleansing and purifying of dwelling-houses, and for the abatement and removal of nuisances and matters injurious to health, in every case in

which there shall not be a council or other governing body of a city or borough, or commissioners having jurisdiction for the removal of nuisances, or where such council, governing body, or commissioners shall not cause to be effectually executed such directions; and for that purpose—

To visit from time to time, or cause to be visited, the several dwellings and places where there may be ground for believing that necessity will arise for executing such directions.

VIII. And in every case in which, from the poverty of occupiers or otherwise, there may be default or delay in the cleansing or purifying of any such dwelling-house, or in the abatement or removal of any such nuisance or matter injurious to health, and the medical officer or other person duly authorized as aforesaid shall certify that the same requires immediate attention; and in every case in which from want of co-operation of the owners or occupiers there is any default or delay in cleansing any such drain, ditch, watercourse, or gutter into which several dwellings or tenements may drain;

We authorize and require such guardians to cause such dwelling-houses to be cleansed and purified, and such drain, ditch, watercourse, or gutter to be frequently and effectually cleansed, and such nuisance or matter injurious to health to be abated and removed respectively, and to do all acts and provide all matters and things necessary for that purpose.

IX. And we do further authorize and require the guardians to direct their clerk to make out from the register of deaths, or from the district medical relief books, and from any public books or other sources from which information may be obtained within the union, a list of places where epidemic, endemic, and contagious diseases have of late been frequent.

X. And we authorize and require such guardians to cause the medical officers employed by them, or specially appointed for the purpose, to visit the places, of which a list shall be made out as aforesaid, and all such neighbouring and other places within such union as shall appear to such medical officers (from being under like circumstances with the places included in such list or otherwise) to require visitation or examination;

XI. And each such medical officer shall, where it may be necessary, certify in writing to the board of guardians, and to the surveyors, trustees, occupiers, or others required to execute these directions and regulations, all such places as are in a state dangerous to health, or need frequent and effectual cleansing by way of preservation against disease, and such dwelling-houses as are in a filthy and unwholesome condition, and all such nuisances and matters injurious to health as ought to be abated, cleansed, and removed under these regulations.

XII. And each such medical officer shall forthwith, upon any case of cholera, or of typhus, or other epidemic, endemic, and contagious diseases becoming known to him within the parish, union, or district under his visitation, report the same to the board of guardians.

XIII. And where it shall be certified to the guardians by their medical officer or officers, or where it shall otherwise sufficiently appear to such guardians, that extraordinary medical aid is required for persons attacked or threatened by cholera, or epidemic, endemic, or contagious disease, we authorize and require such guardians to provide sufficient medical aid, and, in suitable places, such medicines as may be required within their respective unions for necessitous persons attacked by cholera or by premonitory symptoms, and to make arrangements for the distribution of notices, stating the places where aid and medicines shall have been provided.

XIV. Whereas it has heretofore been found impracticable to ensure proper treatment in their own houses to many of the poorer classes, we authorize and require the said guardians, where it shall appear that such extraordinary aid is required, to provide suitable rooms or places, capable of accommodating neces-

sitous cases, to which persons attacked by cholera, who cannot be properly treated in their own houses, may be conveyed.

XV. And we also authorize and require the said guardians, where it shall appear needful, to provide rooms or places of refuge, to which may be removed the families of such necessitous persons as have been attacked with cholera, and also such necessitous persons living under the same roof with, or in the vicinity of, persons so attacked, as the medical officers acting under the authority of the said guardians may deem it necessary to remove; and the houses, rooms, or dwellings from which persons may have been so removed to the houses of refuge shall be cleansed and purified by the owners or persons having the care or ordering thereof, or, in their default, by the said guardians.

XVI. And on the occurrence of any case of cholera, or other epidemic, endemic, or contagious disease, in any room occupied by one family or more, we hereby authorize and require the medical officer to remove, or cause to be removed, either the patient, or so many of the occupants of such room as he shall consider would, unless removed, tend to prevent the recovery of the patient, or endanger the spreading of the disease.

XVII. And in case of death by cholera, or any other epidemic, endemic, or contagious disease, we hereby authorize and require the last medical attendant upon the person of the deceased, or, in case of there having been no medical attendant, the housekeeper or person present at the death, or who is in charge of the body, forthwith to notify the fact of the death to the medical officer of the district who is charged with the execution of these orders for the prevention of the spread of such disease.

And we do hereby authorize such medical officer to give such directions as may appear to him to be needful, in respect to the care, removal, and the time of interment of the body, for preventing the communication or spread of disease.

And we hereby authorize and require all persons to give such information or such assistance to such medical officer, and to be otherwise aiding him, as he may need in the execution of these orders.

XVIII. And in the event of the fatal termination of any case of cholera, or of epidemic, endemic, or contagious disease, in any room occupied as a living or sleeping room by one family, or more, or by numerous persons, we hereby authorize and require the medical officer to remove, or cause to be removed, as speedily as may be, either the corpse or the persons occupying such rooms, until the corpse can be conveniently removed and properly interred.

XIX. And we do authorize and direct the said guardians to make arrangements for obtaining daily lists of persons attacked by cholera or other epidemic diseases within their respective unions, with the particulars of their cases and treatment, and for communicating the same daily to the General Board of Health.

XX. And we do hereby authorize and direct the said guardians, where it may appear needful, to appoint such additional medical officers, and also to appoint such other officers, as may be necessary to execute and superintend the execution of these regulations, and to publish and circulate, by printed handbills or other means, notices of the provisions of the said Act for the prevention of nuisances, and of our regulations and instructions, or of such part of any of them as it may appear desirable to make publicly known.

Given under our hands and under the seal of the General Board of Health this third day of November, One thousand eight hundred and forty-eight.

CARLISLE.
EDWIN CHADWICK.
T. SOUTHWOOD SMITH.

No. 8.—*Extract from the Evidence of J. Hodgson, Esq., on Dr. McCann's Plan.*

MR. HODGSON, who was a member of the Sanitary Board at Birmingham, thus expresses himself respecting the proceedings of Dr. McCann, who was despatched by the Government, in 1832, to Bilston:—

“We were acquainted with what was going on at Bilston, but it was after it was all over at Bilston that I saw Dr. McCann, and conversed with him upon the subject. I have always felt since that time that, so far as my little knowledge of the matter went, if cholera ever threatened this country again it would be a very manageable disorder, provided Dr. McCann's ideas were fully explained and acted upon, namely, that cholera consisted of two parts—the premonitory condition and the condition of collapse, and that if you catch the disease in the premonitory condition you may stop it at once, but that when it comes to the other condition there is great danger. I wish to state that I consider that very great merit is due to Dr. McCann; there is no merit due to me except that of pointing out to my friend Mr. Chadwick the importance of Dr. McCann's proceedings, which I verily believe furnish a key to the management of this terrible malady. I ascribe to Dr. McCann the merit, not of having first said that there is a premonitory stage, and pointing out that part of the history of the disease, but of having insisted upon, and of having drawn particular attention to this point, namely, that there is a stage at which you may stop the disease at once and readily; but if it gets into the other stage, there is no known treatment upon which any reliance can be placed. I conversed with nearly all the medical gentlemen who went to Bilston to attend the cholera patients there, and also with many medical friends residing in the neighbourhood of Bilston, where cholera prevailed, particularly at Wolverhampton, where cholera was fatal in 193 cases, and they unanimously agreed in opinion as to the importance and efficiency of Dr. McCann's views and proceedings.”*

Mr. Hodgson then proceeds to give his reasons for believing that the great success of Dr. McCann's plan did not depend on the epidemic having run its course and worn itself out, but that it “was owing to his stopping the disease in the premonitory stage.” In Bilston, where it is well known the disease was most destructive, so that, in a population of 14,700 inhabitants, 3568 were attacked, and 742 died, in less than seven weeks, the plan adopted to secure prompt treatment was by opening a dispensary, and urging all persons labouring under bowel complaints to apply for medicine without delay. The disease began on August 4, 1832, and in 22 days 1812 persons had the disease, of whom 503 died; on the 23rd day from the commencement of the attack the dispensary was opened, after which the disease continued 27 days; during this time 1756 new cases occurred, of which 239 were fatal; and of these fatal cases 134 occurred in the first five days after the opening of the dispensary.

“After these first five days, when the dispensary had come into full operation and the people were aware of its benefits, although the number of new cases continued to be nearly as great as previously, the number of fatal cases very much diminished; and in the course of 20 days the fatal cases altogether ceased. Indeed, during the first five days from the opening of the dispensary, the number of fatal cases, as compared with the number in the preceding five days, had decreased from 227 to 134; in the second five days the number was reduced to 59; and on the eighth day from the expiration of that time, being the 18th day after the opening of the dispensary, not a single fatal case was reported; whereas, during the seven days immediately preceding that on which the dispensary was opened, the number of deaths daily had varied from 36 to 50. After that time, namely, 18 days after the opening of the dispen-

* Metropolitan Sanitary Commission, Second Report, with Minutes of Evidence, Svo., p. 60.

sary, only eight fatal cases occurred during the existence of the disease in the town. Now these facts show, that, after the 23rd day, some important agency had checked the fatal progress of the disease; and inasmuch as no other agency was known to be in operation, and the new cases during the subsequent 10 days were as numerous, or nearly so, as in the 10 days preceding the opening of the dispensary, it is fair to conclude that the proceedings then adopted, by stopping the disease in its first or diarrhoeal stage, prevented its progress to the second or collapsed and fatal stage. Such was the conviction of the professional and other attendants upon the cholera patients not only at Bilston, but also in the neighbouring towns where these facts became known. Again, the abiding of the disease at Bilston, where its attacks were so numerous and so fatal, was shorter than in most of the towns of about the same population both in that neighbourhood and in other parts of the kingdom; and it is reasonable to believe that this was owing to its duration at Bilston having been cut short by some agency employed in its treatment there, such having been the case, and no other cause of its stoppage being apparent. In Bilston it continued seven weeks; at Wolverhampton, Dudley, Wednesbury, Sedgley, Willenhall, and West Bromwich, all of which are in the neighbourhood of Bilston, according to the returns received by the Central Cholera Board in London, it remained a longer time; and in Tipton, where it was very fatal, which is an adjoining parish to Bilston, and from which place it was believed to have extended to Bilston, it continued from June to October."

This is a clear and satisfactory exposition of the working of a really efficient method for the management of epidemic cholera; and the results precisely tally with the experience acquired by the Board of Health during the late visitation.

No. 9.—*Instructions as to the Duties of the Medical Superintendents and Visitors of the Metropolitan Districts, in carrying out the Preventive Measures of the General Board of Health.*

THE *Medical Visitors* provided for each district by the Boards of Guardians should be placed under the direction of the Medical Superintendent, who should be appointed by the General Board of Health.

The duty of the Superintendent should be to ascertain the precise localities most affected by cholera in his district, by means of the returns of the District Registrars, which he should consult every day; by the returns of cholera cases and cases of diarrhoea obtained from the District Medical Officers and Visitors; and by any other sources of information which he may be able to render available. He should make out daily lists of such streets and houses as are specially affected, and on these data he should locate his Visitors for their daily work.

The Visitor should take notes of the particulars specified in the annexed "Visitor's Return," and from them he should make a return every day to the Superintendent. It will be his duty to visit every house in the district assigned to him by the Superintendent, once each day at the least, and, in cases of sudden attacks of the epidemic in confined localities, this visitation should be made at such shorter intervals as the emergency of the case may require.

The Visitor should carefully inspect all the affected localities, and report to the Superintendent all instances where cleansing, either external or internal, may be required. And the Superintendent should visit personally the infected localities, in order to see that the visitation, and reporting of cases and nuisances, are properly carried out.

The reports of cleansing operations required should be sent by the Superintendent to the inspectors of nuisances appointed by the parishes, who should

be requested to proceed immediately on the receipt of such notices to take steps for cleansing.

The *Medical Visitors* should be provided with medicines to administer on the spot to all persons found to be suffering from cholera or its premonitory symptoms. But all cholera cases and premonitory cases which may have passed into cholera should be transferred immediately to the Medical Officers of the districts in which they may occur. The treatment of premonitory cases should be continued by the Medical Visitors. The *Lay Visitors* (where such are employed) should endeavour to discover the existence of cholera cases and cases of diarrhœa in the district assigned to them, and they should immediately send either the patient or one of his friends or neighbours to the nearest Medical Officer for assistance; and they should keep a note of all cases, in order to be able to ascertain whether the parties have applied. Their special duties should be to bring the patient by all means in contact with medical relief at the earliest possible period after the discovery of the case.

An important duty of both classes of Visitors should be to converse with the people, to allay alarm, and to give them advice on such matters of a sanitary nature, as cleanliness, personal habits, ventilation, temperance, &c., as may be requisite.

They should impress on the people the danger of neglecting diarrhœal symptoms, and the necessity of immediate application to the surgeries of the Medical Officers, at any hour of the day or night, by all persons who may be seized with indisposition in the intervals between their visits.

They should specially caution the people not to wait, if taken ill, till the Visitor comes round, but to apply at the proper district dispensary at once.

Daily returns of cholera cases and cases of diarrhœa should be furnished by the parochial Medical Officers each day to the Medical Superintendent, and the returns should specify the residences of persons attacked by cholera, and at least the *locality* from whence the cases of diarrhœa have proceeded.

The Medical Superintendent should report daily to the General Board of Health on the state of disease in his district, in schedules to be provided for the purpose.

Whenever the number of visitors is found to be insufficient to do the work of household visitation effectually, the Medical Superintendent should report the fact to the General Board of Health. He should also report all neglects in carrying out cleansing operations; and in case he has reason to believe that the medical attendance on the sick is insufficient, or that the system of refuge is not effectually carried out, or that further hospital accommodation for the sick is required, he should immediately report the fact to the General Board of Health. The Superintendent should also make inquiries as to any large works which may exist in his district. He should ascertain whether any provision of medicines has been made for the treatment of diarrhœa at such works, and report to the General Board of Health what measures may be necessary.

Handbills should be distributed throughout the affected districts to inform the people of these arrangements, as the Medical Superintendent may direct.

General Board of Health, Gwydyr House,
Whitehall, September, 1849.

11.—RETURN of CHOLERAIC DISEASE in the PARISH of BETHNAL-GREEN, in the practice of the parochial Medical Officers, and discovered by the Visitors during the Visitation.

Date.	Diarrhœa.					Approaching Cholera.					Cholera.					Corpses.	Total.
	Visitors.	Dispensary.	Medical.	Workhouse.	Total.	Visitors.	Dispensary.	Medical.	Workhouse.	Total.	Visitors.	Dispensary.	Medical.	Workhouse.	Total.	Visitors.	Choleraic Disease.
Aug. 31*	24	..	39	3	66	2	..	..	..	2	4	..	11	9	24	..	92
Sept. 1	54	..	48	1	103	2	..	5	..	7	3	..	10	3	16	..	126
2†	66	41	31	6	144	4	4	15	..	23	3	22	17	4	46	1	214
3	88	88	60	6	242	4	11	4	..	19	2	3	1	4	10	1	272
4‡	173	77	27	5	282	7	23	2	..	32	1	4	12	4	21	..	335
5	153	57	21	8	239	10	15	3	..	28	2	5	11	3	21	2	290
6	215	88	18	..	321	4	13	9	..	26	3	2	16	5	26	..	373
7	252	82	5	..	339	5	9	8	..	22	3	4	13	..	20	..	381
8	182	67	8	..	257	9	12	2	..	23	3	7	21	7	38	1	319
9	191	110	..	..	301	7	9	1	..	17	..	3	16	5	24	1	343
10	173	133	24	5	335	3	6	5	..	14	..	6	20	..	26	..	375
11	179	185	25	..	389	2	13	13	..	28	..	6	14	2	22	..	439
12	212	105	28	..	345	..	24	19	..	43	1	7	9	2	19	..	407
13	207	157	16	..	380	1	9	5	..	15	2	3	13	2	20	..	415
14	187	141	20	3	351	4	20	10	2	36	2	..	8	..	10	..	397
15	148	126	15	..	289	1	8	11	..	20	..	..	3	..	3	..	312
16	142	53	9	4	208	..	1	7	..	8	1	..	..	..	1	..	217
17	155	115	16	..	286	..	2	1	..	3	..	2	5	..	7	..	296
18	211	112	10	8	341	..	3	3	..	6	..	..	1	..	1	..	348
19	185	117	17	..	319	5	3	5	..	13	..	..	6	2	8	..	340
20	237	91	18	..	346	1	1	..	..	2	..	..	1	1	2	..	350
21	347	70	7	..	424	7	3	3	..	13	..	..	1	..	1	..	438
22	391	57	18	..	466	5	2	2	..	9	..	..	3	..	3	..	478
23	227	48	10	..	285	4	1	1	..	6	..	..	2	..	2	..	293
24	319	85	9	..	413	4	..	2	..	6	1	1	2	..	4	..	423
25	296	72	17	..	385	1	1	..	..	2	..	..	7	..	7	2	396
26	275	75	7	..	357	3	2	1	..	6	1	..	3	1	5	..	368
27	211	63	1	..	275	4	1	..	..	5	..	..	1	..	1	..	281
28	264	93	5	..	362	4	7	5	..	16	1	1	6	..	8	..	386
29	292	71	6	..	369	1	1	1	..	3	1	..	5	..	6	..	378
30	179	45	..	..	224	..	..	1	..	1	..	..	3	1	4	..	229
Oct. 1	330	86	5	..	421	2	1	2	..	5	2	1	3	1	7	..	433
2	250	77	6	..	333	4	..	6	..	10	2	..	12	..	14	..	357
3	222	40	5	..	267	..	1	3	..	4	..	..	4	..	4	..	275
4	225	51	4	..	280	..	..	..	..	..	..	..	..	..	..	..	280
5	221	47	8	..	276	1	..	..	..	1	1	..	1	..	2	..	279
6	185	44	3	..	232	..	3	3	..	6	..	..	..	..	..	..	238
7	153	23	2	..	178	..	2	2	..	4	..	1	..	..	1	..	183
8	218	53	5	..	276	..	2	1	..	3	..	..	..	..	..	..	279
9	168	34	4	..	206	1	..	2	..	3	..	..	..	..	..	..	209
10	189	70	1	1	261	2	1	..	..	3	..	..	..	..	..	..	264
11	171	37	5	..	213	..	3	2	..	5	..	..	1	..	1	..	219
12	121	39	5	..	165	1	..	..	..	1	..	..	2	..	2	..	168
13	124	28	1	..	153	1	..	..	..	1	..	..	1	..	1	..	155
14	113	16	1	..	130	..	1	2	..	3	..	..	..	..	..	..	133
15	152	24	3	..	179	..	1	1	..	2	..	..	..	1	1	..	182
16	145	26	..	..	171	..	..	..	..	..	..	..	..	1	1	..	172
17	120	20	..	..	140	..	..	..	..	..	..	..	..	..	..	..	140
18	121	30	..	..	151	..	..	..	..	..	..	..	..	..	..	..	151
19	139	..	..	..	139	4	2	..	..	6	..	..	..	..	..	..	145
20	78	18	..	..	96	..	..	..	..	..	..	..	..	..	..	..	96
21	75	17	1	..	93	..	..	..	..	..	..	..	..	..	..	..	93
22	31	6	..	..	37	..	..	..	..	..	..	..	..	..	..	..	37
23	47	5	2	..	54	..	..	..	..	..	..	..	..	..	..	..	54
	9833	3415	596	50	13,894	120	221	168	2	511	39	78	265	58	410	8	14,853

* One visitor.

† Two visitors.

‡ Four visitors.

No. 12.—The following TABLE, prepared by Mr. LIDDLE, and which is referred to at page 163 of my Report, will show the daily progress of cases of Cholera, Approaching Cholera, and Diarrhœa, and cases which passed into Cholera, from the 8th of September to the 4th of October, in the parishes of St. Luke, Islington, and Clerkenwell, and in the Whitechapel Union from the 16th of September to the 4th of October, 1849 :—

ST. LUKE.								ISLINGTON.*							
Medical Officers.				Visitors.				Medical Officers.				Visitors.			
Date.	D.	R. W. P.†	C.	D.	R. W. P.	C.	Passed into Cholera.	D.	R. W. P.	C.	D.	R. W. P.	C.	Passed into Cholera.	
Sept.															
8	44	10	32	17	..	..	1	..	..	..	..	..	..	..
9 & 10	66	22	23	81	1	4	1	..	..	9	147	12	..	..
11	40	11	15	57	..	4	..	..	..	7	131	10	..	..
12	47	10	14	69	8	1	1	..	7	14	35	5	..	..
13	37	7	16	53	..	1	1	..	33	7	66	6	..	..
14	26	5	16	41	2	2	4	67	12	6	55	1	5	1	
15	6	1	5	16	2	..	2	40	..	2	61	1	..	1	
16 & 17	88	13	8	102	..	..	1	79	..	..	120	7	4	1
18	33	3	15	42	..	..	3	35	1	..	56	4	..	1
19	33	1	2	15	..	..	..	43	..	1	61	3	..	..
20	30	2	4	37	..	..	..	29	..	1	67	1	2	..
21	24	3	6	17	..	..	..	18	0	2	50	1	2	..
22	11	1	1	28	..	..	..	25	..	2	52	3	..	..
23 & 24	39	1	1	43	..	1	..	..	..	..	39	1	1	..
25	16	2	..	59	..	..	..	44	..	3	37	2	..	..
26	16	3	2	22	..	..	..	26	..	..	45	3	..	..
27	33	4	..	31	..	..	..	20	..	2	40	3	2	1
28	19	2	5	25	..	..	..	21	..	..	29	3	..	..
29	13	1	..	27	1	..	..	21	..	1	45	1	..	..
30 & } 1 Oct. }	26	3	6	34	2	..	2	14	..	..	78	1	..	..
2	15	2	3	32	2	..	..	38	..	2	60	..	..	..
3	14	2	1	24	2	..	..	24	..	..	81	1	..	..
4	12	2	3	18	..	..	..	21	..	..	47	1	..	..
Total .	688	111	178	890	20	13	16	565	53	59	1302	70	16	5	

* The returns of the number of diarrhœa cases which were attended by the medical officers of Islington are very imperfectly recorded in this table.

† Rice-water purging, or approaching cholera.

NOTE ON THE CHOLERA MAP OF HAMBURG.

This map, copied from the interesting work of Dr. Rothenburg,* and which indicates by the depth of the red tinting the relative severity of the epidemic of 1832 in the several districts of the city of Hamburg, places in a striking point of view the predominating influence of locality over the progress of the disease. By casting the eye over the map it will be observed that the epidemic specially developed itself along the river Elbe, and the streets bordering the numerous canals which intersect the city: so much indeed is this the case that the course of the latter may be immediately recognised by the deep red streak on each of their sides. The further details may be gathered from the following extract from my Report on the progress of Cholera in Hamburg, containing a brief analysis of Dr. Rothenburg's investigations as to locality:†—

" 1. The per centage of attacks for the whole city in the epidemic of 1832 was 2·26, and of deaths 1·12.

" 2. In the tract of the city that extends along the Elbe, including that of the canals, the proportion of attacks was 3·63, and of deaths 1·85.

" 3. In the district which includes the eastern height of the city, but which also includes very many poor, the attacks were 1·97, and the deaths 1·04.

" 4. The district which takes in the middle of the city suffered less than the preceding, the proportions being—attacks 1·80, deaths 0·72.

" 5. The part that suffered least was the western part of the town, which was at that period the airiest and newest portion, and traversed by a greater number of straight streets, and this notwithstanding that many poor dwelt together in the labyrinth of alleys which existed in portions of the district. Here only 1·25 per cent. of the inhabitants were attacked, whilst the deaths were as low as 0·65.

" A closer analysis places in a still stronger light the predominating influence of locality. Thus, of the first group noticed above, taking the district lying immediately on the Elbe (from Eichholz to Schaarthor), the cases rose to 3·76, and the deaths to 2·05. But the most fatal attacks were made in the street called the 'Erste Vorsetzen,' where the attacks amounted to the enormous portion of 7·13 per cent. of the inhabitants, and the deaths to 3·01; and in another street leading out of the former, named 'Neuerweg,' the attacks were 7·67, and the deaths 3·06; while in the fourth or best district, where, nevertheless, a very great number of the poor dwelt, the attacks were only 1·53, and the deaths 0·79: even in the labyrinth of alleys of this district the cases were but 1·47, and the deaths 0·81.

" It is thus found that, irrespective of poverty, irrespective even of crowding, there was a difference in the same class of inhabitants, namely, the poor, represented by the following ratio:—

	Attacks.	Deaths.
Healthiest locality . . .	1·53	0·79
Unhealthiest locality . . .	7·67	3·06

" That is, among the poor residing in the most unhealthy part of Hamburg there were five times as many attacks of cholera, and nearly four times as many deaths as among the poor living in the most healthy district."

It is very important to know the condition of the localities thus severely visited, and for this purpose I cannot do better than adduce the description given of them to me by Mr. Lindley, an eminent English engineer, who was employed by the authorities to rebuild the city on an improved sanitary

* Die Cholera—Epidemie des Jahres 1832, in Hamburg.

† See "Official Circulars of the General Board of Health," p. 52.

plan after the great fire of 1842, by which nearly one-third of Hamburg was destroyed : —

“ Upon comparing the map of the town, which shows the upland and marsh levels (as these ought to be called, although covered with buildings), with the cholera map of Dr. Rothenburg, it is immediately apparent as a general rule that the main ravages of the disease have been in the latter, and that the former has comparatively escaped. To this there is a marked exception in the suburb of St. Paul's, which, although in the immediate vicinity of the Elbe, lies at a very high level; it is frequented by sailors, &c., and is, in fact, the Wapping of Hamburg. Upon a more careful scrutiny, it appears that those parts of the marsh district which are most subject to the periodical floodings of the Elbe, and which are intersected by numerous canals, are those in which the cholera especially prevailed. It is particularly to be noticed that the whole drainage of these localities is into the canals and open ditches, there being no system of sewers in the old town to carry off the refuse. One district lying between Eichholz and Vorsetzen, which is depicted in the cholera map as having suffered in a high degree, forms a shallow basin lying between the foot of the uplands and the Elbe; the whole of this district is flooded from above by the former, and below from the latter, without having any efficient drainage outlet for this excess of water. The direction of the disease from the district just described, follows in a very marked manner the course of two canals up the Jungfernstieg, which is the best part of the city. One of these canals, called the Bleichen Fleth, was noted at the time of the visitation for its offensive exhalations; it was, in fact, a vast cesspool, and so affected the neighbouring houses, which were some of the best in the town, that it was often necessary in the summer to close the windows. There is a tongue of land extending between the inner harbour and the present city ditch, called Kehr wieder, which is also marked as a locality that suffered severely: this district lies also very low, and in addition to the inner harbour and city ditch, is intersected by most noisome ditches. It is interesting to observe how the disease here, as elsewhere, has followed the course of the water; a narrow strip, Doven Fleth, strongly tinted, runs along the canal of the same name, leading out of the inner harbour. The houses adjoining the several canals (or fleths) of this district are all marked as suffering in a similar manner, the sanitary condition being the same. On casting the eye over the cholera map, there is nothing more striking than a long strip, deeply tinted, as indicating the severity of the disease, called the Stadtdeich, and which, for the following reasons, is particularly worthy of attention: along the whole length of the back of this range of houses, runs a wide open ditch, originally made for the drainage of the adjoining marsh land, but for a long period of years used as a depository for the *débris* of the dwellings; on the opposite side lie extensive timber ponds, and lands exposed at low water upon which timber is deposited for long periods, thus forming a large surface of decomposing vegetable matter, alternately covered by the river and exposed to the sun.”

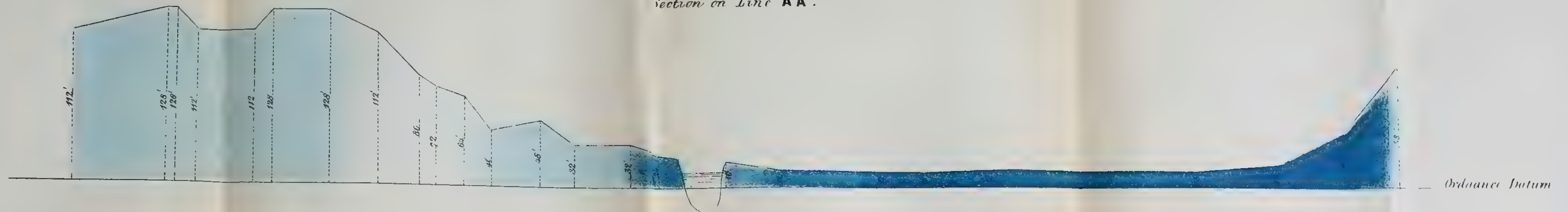
The results of the great improvements effected by Mr. Lindley are briefly noticed in the body of the present Report.

SECTIONS

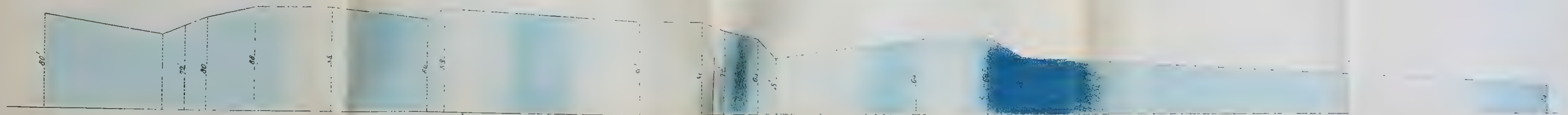
Shewing the relative intensity of the attack of Cholera at the various levels along the lines marked on

THE CHOLERA MAP.

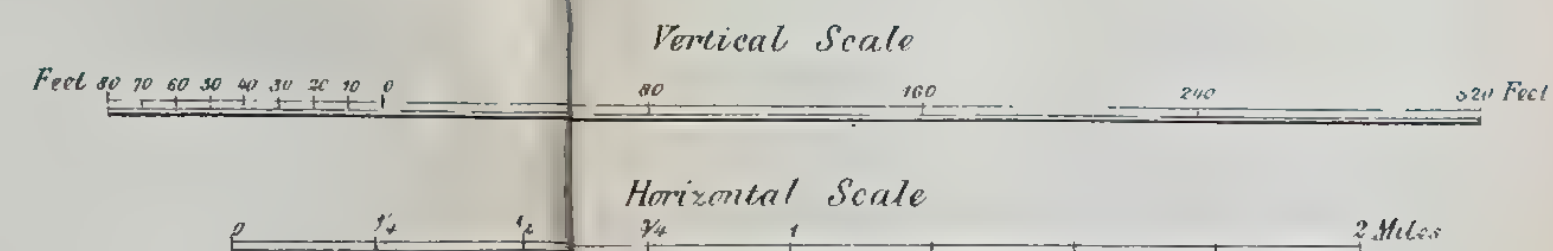
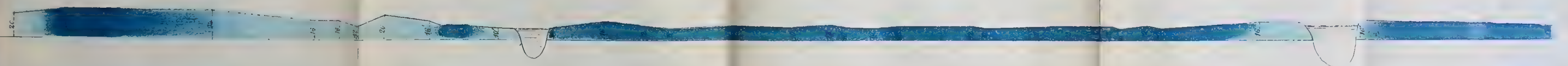
Section on Line A A.



Section on Line B B.



Section on Line C C.



PARISH OF ISLINGTON

PARISH OF ST JOHN HACKNEY



- 1 Windmill Square
- 2 Funnell's Asham
- 3 Bridge over Drainage
- 4 Charles Square
- 5 Funnell's Mill
- 6 Christopher Square
- 7 Waterworks Place
- 8 Waterworks
- 9 Park Place
- 10 Green and Mill Lane

PLAN OF THE PARISH OF
ST LEONARD
SHOREDITCH.

Shewing the deaths from Cholera during the Epidemic of 1848-1849.

PREPARED BY H CAVIN, M D.

SCALE
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
1 Mile

Map of the PARISH OF BETHNAL GREEN.

Shewing the Cholera Mist in 1848-1849.

PREPARED BY HECTOR GAVIN, M.D.



NOTE.

- The black lines mark the Sewers.
- Lines marked thus denote Open Sewers.

Scale of Half a Mile.



No. 1.—RETURN of DEATHS from CHOLERA in the 60 WEEKS ending November 24, 1849.

[illegible]

CHOLERA MAP OF THE METROPOLIS, 1849.

EXHIBITED IN THE REGISTRATION DISTRICTS.



REFERENCE,

SHewing THE MORTALITY FROM CHOLERA
IN EACH REGISTRATION DISTRICT.

1 Kensington	Deaths in 1000 Population	20 Chelsea	Deaths in 1000 Population
a. Kensington St. Mary	11	a. Chelsea South	74
b. Kensington St. John	11	b. Chelsea North West	81
c. Kensington St. Peter	31	c. Chelsea North East	56
d. Kensington	65		
2 Chelsea	Deaths in 1000 Population	3 St. George Hanover Square	Deaths in 1000 Population
a. Chelsea South	74	a. Hanover Square	3
b. Chelsea North West	81	b. Portico	13
c. Chelsea North East	56	c. St. George	35
3 St. George Hanover Square	Deaths in 1000 Population	4 Westminster	Deaths in 1000 Population
a. Hanover Square	3	a. St. John	55
b. Portico	13	b. St. Mary	75
c. St. George	35		
4 Westminster	Deaths in 1000 Population	5 St. Martin in the Fields	Deaths in 1000 Population
a. St. John	55	a. Channing Cross	40
b. St. Mary	75	b. Long Lane	26
5 St. Martin in the Fields	Deaths in 1000 Population	6 St. James Westminster	Deaths in 1000 Population
a. Channing Cross	40	a. St. James Square	20
b. Long Lane	26	b. St. James Square	11
6 St. James Westminster	Deaths in 1000 Population	7 Marylebone	Deaths in 1000 Population
a. St. James Square	20	a. St. John	26
b. St. James Square	11	b. Cavendish Square	11
7 Marylebone	Deaths in 1000 Population	8 Bloomsbury	Deaths in 1000 Population
a. St. John	26	a. Bloomsbury	34
b. Cavendish Square	11	b. St. Mary	8
8 Bloomsbury	Deaths in 1000 Population	9 Pancras	Deaths in 1000 Population
a. Bloomsbury	34	a. Pancras	23
b. St. Mary	8	b. Pancras	10
9 Pancras	Deaths in 1000 Population	10 Hackney	Deaths in 1000 Population
a. Pancras	23	a. Hackney	15
b. Pancras	10	b. West Hackney	22
10 Hackney	Deaths in 1000 Population	11 St. Giles	Deaths in 1000 Population
a. Hackney	15	a. St. Giles	11
b. West Hackney	22	b. St. Giles South	27
11 St. Giles	Deaths in 1000 Population	12 Strand	Deaths in 1000 Population
a. St. Giles	11	a. Strand	16
b. St. Giles South	27	b. Strand	11
12 Strand	Deaths in 1000 Population	13 Holborn	Deaths in 1000 Population
a. Strand	16	a. Holborn	11
b. Strand	11	b. Holborn	8
13 Holborn	Deaths in 1000 Population	14 Clerkenwell	Deaths in 1000 Population
a. Holborn	11	a. Clerkenwell	27
b. Holborn	8	b. Clerkenwell	18
14 Clerkenwell	Deaths in 1000 Population	15 St. Luke	Deaths in 1000 Population
a. Clerkenwell	27	a. St. Luke	4
b. Clerkenwell	18	b. St. Luke	4
15 St. Luke	Deaths in 1000 Population	16 East London	Deaths in 1000 Population
a. St. Luke	4	a. East London	3
b. St. Luke	4	b. East London	45
16 East London	Deaths in 1000 Population	17 West London	Deaths in 1000 Population
a. East London	3	a. West London	208
b. East London	45	b. West London	101
17 West London	Deaths in 1000 Population	18 London City	Deaths in 1000 Population
a. West London	208	a. London City	103
b. West London	101	b. London City	16
18 London City	Deaths in 1000 Population	19 Shoreditch	Deaths in 1000 Population
a. London City	103	a. Shoreditch	133
b. London City	16	b. Shoreditch	112
19 Shoreditch	Deaths in 1000 Population	20 Bethnal Green	Deaths in 1000 Population
a. Shoreditch	133	a. Bethnal Green	118
b. Shoreditch	112	b. Bethnal Green	145
20 Bethnal Green	Deaths in 1000 Population	21 Whitechapel	Deaths in 1000 Population
a. Bethnal Green	118	a. Whitechapel	27
b. Bethnal Green	145	b. Whitechapel	61
21 Whitechapel	Deaths in 1000 Population	22 St. George in the East	Deaths in 1000 Population
a. Whitechapel	27	a. St. George	35
b. Whitechapel	61	b. St. George	30
22 St. George in the East	Deaths in 1000 Population	23 Spoken	Deaths in 1000 Population
a. St. George	35	a. Spoken	9
b. St. George	30	b. Spoken	88
23 Spoken	Deaths in 1000 Population	24 Poplar	Deaths in 1000 Population
a. Spoken	9	a. Poplar	10
b. Spoken	88	b. Poplar	10
24 Poplar	Deaths in 1000 Population	25 St. Saviour Southwark	Deaths in 1000 Population
a. Poplar	10	a. St. Saviour	152
b. Poplar	10	b. St. Saviour	152
25 St. Saviour Southwark	Deaths in 1000 Population	26 St. Mary Southwark	Deaths in 1000 Population
a. St. Saviour	152	a. St. Mary	182
b. St. Saviour	152	b. St. Mary	142
26 St. Mary Southwark	Deaths in 1000 Population	27 Bermondsey	Deaths in 1000 Population
a. St. Mary	182	a. Bermondsey	2
b. St. Mary	142	b. Bermondsey	2
27 Bermondsey	Deaths in 1000 Population	28 St. George Southwark	Deaths in 1000 Population
a. Bermondsey	2	a. St. George	15
b. Bermondsey	2	b. St. George	21
28 St. George Southwark	Deaths in 1000 Population	29 Newington	Deaths in 1000 Population
a. St. George	15	a. Newington	159
b. St. George	21	b. Newington	19
29 Newington	Deaths in 1000 Population	30 Lambeth	Deaths in 1000 Population
a. Newington	159	a. Lambeth	159
b. Newington	19	b. Lambeth	125
30 Lambeth	Deaths in 1000 Population	31 Wandsworth	Deaths in 1000 Population
a. Lambeth	159	a. Wandsworth	30
b. Lambeth	125	b. Wandsworth	175
31 Wandsworth	Deaths in 1000 Population	32 Camberwell	Deaths in 1000 Population
a. Wandsworth	30	a. Camberwell	182
b. Wandsworth	175	b. Camberwell	75
32 Camberwell	Deaths in 1000 Population	33 Rotherhithe	Deaths in 1000 Population
a. Camberwell	182	a. Rotherhithe	270
b. Camberwell	75	b. Rotherhithe	270
33 Rotherhithe	Deaths in 1000 Population	34 Greenwich	Deaths in 1000 Population
a. Rotherhithe	270	a. Greenwich	51
b. Rotherhithe	270	b. Greenwich	49
34 Greenwich	Deaths in 1000 Population		
a. Greenwich	51		
b. Greenwich	49		

NOTE

The Superintendent Registrar districts which are in accordance with the Poor Law Union are indicated by figures thus 6 9 &c.
The Sub Registrar districts are marked by letters in italics thus a b &c.

The Red Figures denote the elevation in Feet above the Trinity High Water Mark.



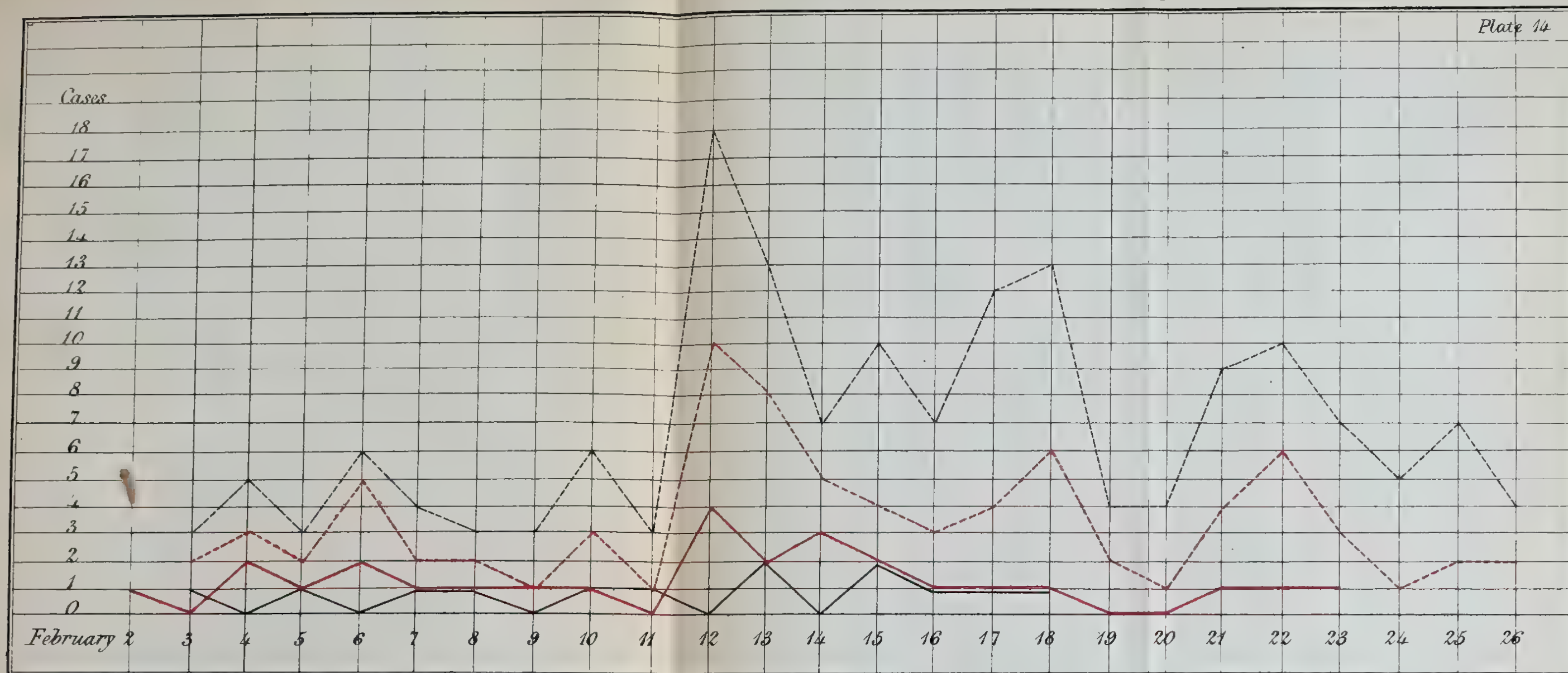


Diagram of an entire epidemic at Glengarnock Iron Works, Ayrshire. The dotted Black line represents the numerical boundary of the epidemic, and the space between it, and the dotted Red line the amount of Diarrhoea Cases. The space between the dotted Red line and the continuous Red line represents the number of Cases arrested in their passage from the rice water purging stage to developed Cholera. The continuous Red line represents the number of Cholera Cases, and the continuous Black line the number of deaths.

D^r Sutherland's Report.

Standard & Co. Litho. Cal. Jan.

